REVISION OF AUSTRALIAN *BEROSUS* LEACH (COLEOPTERA: HYDROPHILIDAE)

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The Australian members of the hydrophilid genus *Berosus* are revised and redescribed. A key to species is given. Thirty-two species are recognised of which 18 are described as new: *B. amoenus*, *B. arcus*, *B. aquilo*, *B. dallasae*, *B. gibbae*, *B. josephenae*, *B. juxtadiscolor*, *B. reardoni*, *B. macropunctatus*, *B. sadieae* *B. nicholasi*, *B. niger*, *B. quadrapunctatus*, *B. trishae*, *B. timmsi*, *B. veronicae*, *B. ralphi* and *B. vijae*.

The following synonymies are proposed: *B. flindersi* Blackburn = *B. discolor* Blackburn; *B. ovipennis* Fairmaire = *B. simulans* Blackburn = *B. stigmaticollis* Fairmaire = *B. auriceps* Blackburn = *B. blackburni* Zaitz = *B. approximans* Fairmaire; *B. quartinus* d'Orchmont = *B. queenslandicus* Blackburn; *B. gravis* Blackburn = *B. australiae* Mulsant.

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The hydrophilid fauna of Australia is relatively rich in species and numbers of individuals. They form a conspicuous part of the aquatic fauna. In general they are well-collected and well-represented in collections. Despite this they have received little recent taxonomic attention.

A major difficulty in dealing with *Berosus* Leach, 1817 in Australia was the inadequacies of existing keys which reflected a weak taxonomic base exemplified by the fact that some 18 of the 32 known species were undescribed, including the commonest southern species. At the same time some widespread species were described under as many as five different names.

The last major attempt to revise Australian *Berosus* was by Blackburn in 1898.

Some characters used in the key, such as leg colour and details of the punctation, are not totally reliable, but the male genitalia have provided good characters in all cases.

The genus *Berosus* is a member of the subfamily Berosinae which is characterized by a markedly deflexed head, seven- or eight-segmented antennae and meso- and metasternae without a continuous common keel.

Berosus can be separated from the other Australian genera in the subfamily (*Regimbartia*, *Globaria* and *Amphiops*) by possession of protruding eyes, seven-segmented antennae, and striae on elytra, although in some species these are partially masked by strong elytral punctations. Adults of all but a few of the smaller species are yellow-brown in colour. They are found mainly among vegetation at the bottom and sides of ponds and pools. Adults are often taken at light sometimes some distance from water. The larvae are distinctive with a series of lateral filamentous appendages and live in pools in similar situations to the adults. I know of no detailed description of the larvae of any Australian species.

Berosus is a large cosmopolitan genus and many attempts have been made to subdivide it, none of which appear particularly satisfactory to me. In particular, the subgenus *Hygrotrophus* W. Macleay which includes only the species *B. (H.) nutans* and *B. (H.) devisi*, both Australian species, seems unwarranted and to be based on an undue emphasis on the punctation of the upper surface.

Within Australian species there are five more or less distinctive groupings.

Group 1 species are small, have the midline of the mesosternum produced downwards in a distinct ridge, head black, metacoxal process weakly to moderately lobed laterally, last abdominal segment notched and the second elytral stria 1/4 the length of the elytron (*B. discolor*, *B. approximans*, *B. reardoni*, *B. juxtadiscolor*, *B. timmsi*).

Group 2 species are small, with the midline of the mesosternum produced downwards in a distinct pillar, head black, metacoxal process strongly lobed laterally, the last abdominal segment notched, the second elytral stria about 1/2 the length of elytron, and with strongly developed medial ridge on first abdominal segment (*B. macropunctatus*, *B. quadrapunctatus*, *B. trishae*).

Group 3 species are similar to Group 2 species except for a less developed medial ridge on first abdominal segment, strongly humpbacked which is associated with the presence of a space between elytral striae 7 and 8 and/or 8 and 9 in the middle of the elytron (*B. involutus*, *B. niger*, *B. arcus*).

Group 4 species are similar to Group 2 but are larger and have the second elytral stria reaching about two-thirds the length of the elytron (*B. duplopunctatus* and *B. queenslandicus*).

Group 5 species are generally larger with brown heads, midline of mesosternum with a weak central keel, and metacoxal process without lateral lobes (*B. nutans*, *B. pulchellus*, *B. dallasi*, *B. macumbensis*, *B. munitipennis*, *B. amoenus*, *B. josephenae*, *B. gibbae*, *B. majusculus*, *B. veronicae*, *B. aquilo*, *B. australiae*, *B. decipiens*, *B. sadieae*, *B. nicholasi*, *B. vijae*, *B. subovatus*, *B. ralphi* and *B. debilipennis*).

Groups 1–4 have similarities with each other and roughly correspond to the subgenus *Berosus* Hope. Group 5 species correspond to the subgenera *Enoplurus* Hope and *Hygrotrophus* W. MacLeay. Since *Berosus* is a world-wide genus, further consideration of subgeneric groupings should include extra-Australian species and is beyond the scope of this revision.

The collections from which specimens were examined are listed under the following abbreviations:

AM	Australian Museum, Sydney.
ANIC	Australian National Insect Collection, Canberra.
BM(NH)	British Museum (Natural History), London.
CW	Private collection of author.
NMV	National Museum of Victoria, Melbourne.
NSW DA	New South Wales Department of Agriculture, Sydney.
NTM	Northern Territory Museum, Darwin.
MNHN	Museum National d'Histoire Naturelle, Paris.
SAM	South Australian Museum, Adelaide.
WAM	Western Australian Museum, Perth.
QPI	Queensland Department of Primary Industry, Mareeba.

KEY TO AUSTRALIAN SPECIES OF *BEROSUS*

1. Midline of mesosternum produced downwards in a distinct pillar (Fig. 10), not projecting backwards between metacoxae. Head black (metallic). Metacoxal process lobed laterally (rudimentary in *B. discolor*). Last abdominal segment notched. Small (<7 mm) 2

1. Midline of mesosternum with weak central keel, projecting weakly forward between mesocoxae. Head completely or partially brown except *B. pulchellus* which lacks elytral striae and *B. amoenus* which has a predominantly black pronotum and elytra also. Metacoxal process triangular (Fig. 1) 14

2. (1) Second elytral stria about 1/4 length of elytron 3

2. Second elytral stria $\geqslant 1/2$ length of elytron . 6

3. (2) Rugose portion of metafemur $<1/2$ length of femur (Fig. 2). Mesosternal pillar flat on ventral edge .... *B. discolor* Blackburn

3. Rugose portion of metafemur $\geqslant 1/2$ length of femur. Mesosternal pillar weakly concave on ventral edge 4

4. (3) Rugose portion of mesofemur 1/2–2/3 length of femur 5

4. Rugose portion of mesofemur $<1/2$ length of femur .... *B. approximans* Fairmaire

5. (4) Rugose portion of meta- and meso-femora pale, same colour as rest of leg . *B. reardoni* sp.nov.

5. Rugose portions of meta- and meso-femora much darker than rest of leg 7

6. (2) Second elytral stria about 1/2 length of elytron, rugose portion of metafemur $\geqslant 1/2$ length of femur 8

6. Second elytral stria at least 2/3 length of elytron, rugose portion of metafemur $<1/2$ length of femur 13

7. (5) Punctures on sides of pronotum uneven in size, interstrial punctures small, subobsolete, hind femur of male with triangular bulge on hind edge .... *B. timmsi* sp.nov

7. Punctures on sides of pronotum evenly sized with only a few smaller ones, interstrial punctures moderately marked, hind femur of male normal .... *B. juxtadiscolor* sp.nov.

8. (6) Space between elytral striae 7 and 8 and/or 8 and 9 greater in middle than at ends of elytron (Fig. 8). Medial ridge on first abdominal segment 1/4 as deep as long, without backward projection on ventral edge 9

8. Elytral striae 7, 8 and 9 subparallel with each other. Medial ridge on first abdominal segment deep 1/3–1/2 as deep as long, with a backward projection on ventral edge 11

9. (8) Elytral stria 8 raised and carinate in middle and towards apex. Distance between elytral striae 8 and 9 greatly enlarged in middle (Fig. 8). Interstrial punctures weak, subobsolete. Northern species 10

9. Elytral stria 8 not raised. Interstriae 7–8 as wide or wider than 8–9 (Fig. 9). Interstrial punctures moderately strong. Southern species .... *B. involutus* MacLeay

10. (9) Rugose portion of metafemur approximately 1/2 length of femur. Punctures on disc of pronotum of two sizes, larger predominating. Posterior portion of carinate eighth interstria at right angles to edge of elytron. Black, except for interstria in apical 1/4 of elytron .... *B. niger* sp.nov.

10. Rugose portion of metafemur reaches 2/3 length of femur on rear edge. Punctures on disc of pronotum of one size, posterior portion of carinate eighth interstria of approximately 45° to edge of elytron (Fig. 8) ... *B. arcus* sp.nov.

11. (8) Pronotum smooth, shiny, moderately covered with large punctures often with spaces greater than 1/2 diameter of puncture or greater between punctures. Pronotum yellow with three longitudinal black stripes 12

11. Head and pronotum rugose, densely covered with large punctures, those on pronotum separated by narrow ridges. Pronotum black except for extreme lateral margins .... *B. macropunctatus* sp.nov.

12. (11) Rugose portions of mesofemur a little under 1/2 length of femur . . *B. quadropunctatus* sp.nov.

12. Rugose portions of mesofemur 1/2–2/3 length of femur .... *B. trishae* sp.nov.

13. (6) Punctures on pronotum of two distinct sizes. Areas between elytral striae with shallow punctures .... *B. duplopunctatus* Blackburn

13. Punctures on pronotum vary little in size. Areas between elytral striae virtually impunctate .... *B. queenslandicus* Blackburn

14. (1) Punctures on elytron densely and evenly distributed, each with a short seta. Punctures in elytral striae difficult to distinguish from those in interstriae 15

14. Punctures on elytra mostly without setae. Punctures in elytral interstriae scattered, distinct from those in striae 17

15. (14) Punctures on pronotum expanded laterally forming a dense network of closely spaced short striae orientated across the pronotum (Fig. 5) .... *B. nutans* W. MacLeay

15. Punctures on pronotum normal 16

16. (15) Small (<5.0 mm), elytron without striae. Head metallic black ...... *B. pulchellus* W. MacLeay

16. Larger (>3.6 mm), elytra with deeply impressed striae. Rear of head with dark markings .... *B. dallasi* sp.nov.

17. (14) Interstrial punctures towards sides of elytra not as numerous as as those on disc, often arranged in a single row 18

17. Interstrial punctures towards sides of elytra more numerous and larger than those on disc, never arranged in single lines .... *B. macumbensis* Blackburn

18. (17) Outer apical spine on elytron long and thin (Fig. 3). Interstrial punctures laterally subobsolete, arranged in one row over most of elytron. Rugose portion of metafemur approximately 1/3–2/3 length of femur. Pale .... *B. munitipennis* Blackburn

18. Not with above combination of characters (Fig. 3) 19

19. (18) Punctures in interstria 3 of two sizes, with small size predominating (Fig. 11). Punctures on disc of pronotum of two sizes mostly large with some smaller ones (e.g. Fig. 7) 22

19. Punctures in interstria 3 of one size, or with only an occasionally smaller one. Punctures on disc of pronotum of one size (e.g. Fig. 6) 20

20. (19) Head black. Interstrial punctures on elytron approximately the same size as those in striae .... *B. amoenus* sp.nov.

20. Head pale brown. Interstrial punctures on elytron smaller than those in striae 21

21. (20) Rugose portions of femore dark-brown .... *B. josephenae* sp.nov.

21. Rugose portion of femore pale-brown .... *B. gibbae* sp.nov.

22. (19) Rugose portions of meso- and meta-femore noticeably darker than rest of femursee Table 1.

22. Rugose portions of meso- and metafemore of same colour as rest of femur 23

23. (22) Larger (>5.9 mm). Number of punctures in second elytral interstria to level of end of second stria >22. Rugose portion of mesofemur approx. 1/3 length of femur. Male with apical abdominal segment notched .... *B. majusculus* Blackburn

23. Smaller (<6.5 mm). Number of punctures in second elytral interstria back to level of end of second stria usually <26. Rugose portion of mesofemur $>1/2$ length of femur except in *B. veronicae* 24

24. Rugose portion of mesofemur $\nless$ 1/2. Apical spines on elytron moderately developed (Fig. 4) .... *B. veronicae* sp.nov.

24. Rugose portion of mesofemur $>1/2$ length of femur ....see Table 2.

SYSTEMATICS

Berosus discolor Blackburn
(Figs 2, 13, 18)

Berosus discolor Blackburn, 1888(1889), p. 829
Berosus flindersi Blackburn, 1888(1889), p. 831, syn. nov.

TABLE 1. Distinguishing characters for four species of *Berosus*.

B. aquilo sp. nov.	*B. australiae* Mulsant	*B. decipiens* Blackburn	*B. sadiae* sp. nov.
3.3–5.0 mm long	6.5–9.0 mm long	6.1–8.0 mm long	4.5–5.0 mm long
Tips of elytron usually without spines.	Tips of elytron with well-developed spines.	Tips of elytron with well-developed spines.	Tips of elytron usually with well-developed spines.
Third segment of male protarsi approximately same length as segment.	Third segment of male protarsi shorter than second segment.	Third segment of male length of second segment.	Third segment of male length of second segment.
Elytral punctures weak. Strial punctures arranged in one line, over most of elytron.	Elytral punctures usually strong, strial punctures not arranged in one line inwards from stria 7.	Elytral punctures usually weak, strial punctures usually arranged in one line over most of elytron.	Elytral punctures usually weak, strial punctures usually arranged in one line over most of elytron.
Coastal Northern Territory.	Australia-wide.	Wyndham to Cairns.	Coastal Northern Territory.

TABLE 2. Distinguishing characters for five species of *Berosus*.

B. debilipennis Blackburn	*B. subovatus* Knisch	*B. vijae* sp. nov.	*B. nicholosi* sp. nov.	*B. ralphi* sp. nov.
4.0-6.0 mm long	3.0-5.0 mm long	3.0-4.5 mm long	5.0-6.5 mm long	3.5-4.5 mm long
Apex of elytron rounded or with weak spines.	Apex of elytron rounded or weakly truncated.	Apex of elytron with weak spines.	Apex of elytron with weak to moderate spines.	Apex of elytron truncated or with weak spines.
Punctures in 1st elytral interstria, scattered, not arranged in a row.	Punctures in 1st elytral interstria, arranged in a single row.	Punctures in 1st elytral interstria, arranged in a single row.	Punctures in 1st elytral interstria, scattered, not arranged in a row.	Punctures in 1st elytral interstria, scattered, not arranged in a single row.
Lateral punctation on elytron moderate to strong.	Lateral punctation on elytron weak.	Lateral punctation on elytron moderate to strong.	Lateral punctation on elytron small and weak.	Lateral punctation on elytron small and weak.
Tip of postcoxal process in same plane as rest of underside.	Tip of postcoxal process in same plane as rest of underside.	Tip of postcoxal process in same plane as rest of underside.	Tip of postcoxal process in same plane as rest of underside.	Tip of postcoxal process bent downwards at 45° to rest of underside.
10-18 punctures in second elytral stria.	6-7 punctures in second elytral stria.	8-13 punctures in second elytral stria.	10-16 punctures in second elytral stria.	7-13 punctures in second elytral stria.
First segment of male protarsi much longer than second.	First segment of male protarsi longer than second.	First segment of male protarsi equal in length to second.	First segment of male protarsi equal in length to second.	First segment of male protarsi longer than second.

Types

Berosus discolor: Holotype, male, Pt Lincoln, S.A., in BM(NH), seen.

Berosus flindersi: Holotype, male, Pt Lincoln, S.A., in BM(NH), seen. Paratype, female, in SAM, seen.

Description (number examined 131)

Length 2.8–4.8 mm. Oval, elytra moderately humped, highest behind middle where it is approximately 1/3 × height at shoulder. Apex of elytron rounded, in some subacute and suggestive of a thick broad spine. Head relatively narrow, black, shiny, metallic. Pronotum black with sides broadly brown, often with small central brown spot or band behind front edge, shiny, metallic. Elytron shiny brown, with striae, punctures and a few spots black. Ventral surface black, appendages brown, except for extreme tips of lapial palps and rugose portion of meso- and metafemur which can range from light-brown to black. Punctures small, dense. Punctures on head strong, regular, well-impressed, most less than 1/2 puncture width apart. Punctures on pronotum similar but slightly less dense. Elytral striae well-impressed. Second stria on elytron 1/4 length of elytron. Punctures in and between striae similar, about same size as on pronotum, strongest laterally, those on extreme humeral angles and between first stria and suture smaller. Mesosternal keel weakly to moderately well-developed, projecting backwards. Metacoxal process sharply produced backwards in midline, lateral lobes raised, sides diverging towards front, small narrowly oval shiny depression in midline. Keel in midline of first abdominal segment weak, reaching only 1/4 to 1/3 of width. Rugose portion of metafemur approximately 1/3 length of femur. Meso- and meta-tibia strongly spined. Apical abdominal segment with small weak notch.

Male: Protarsi four-segmented, first segment moderately expanded.

Remarks

Less common in collections than *B. approximans*. Readily separated from those other *Berosus* with a well-developed mesosternal keel and short second elytral stria by the small area of rugosity on the femora.

Distribution (Fig. 79)

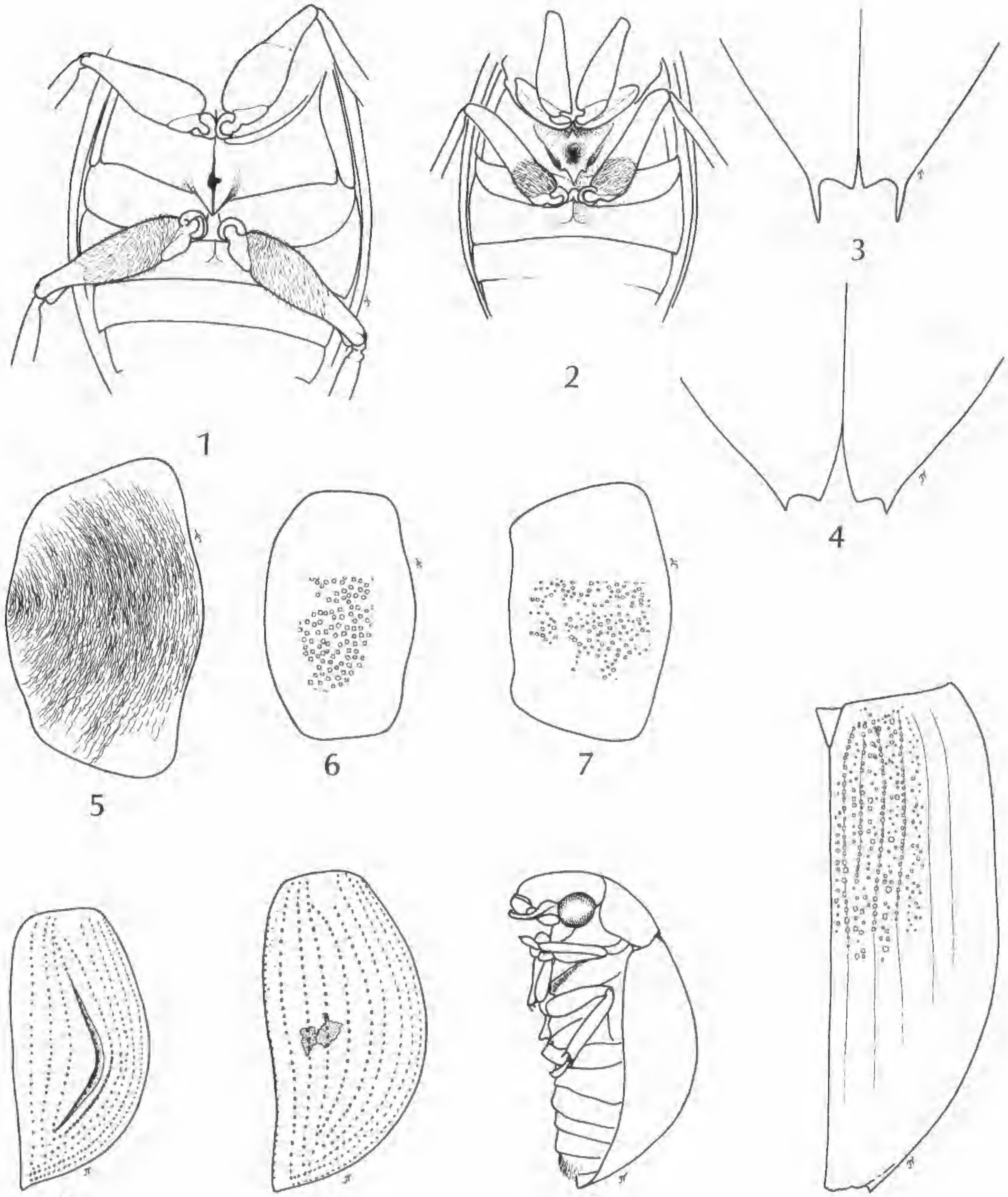
Coastal southern Australia from Perth, W.A. to Sydney, N.S.W., and Tas.

Berosus approximans Fairmaire

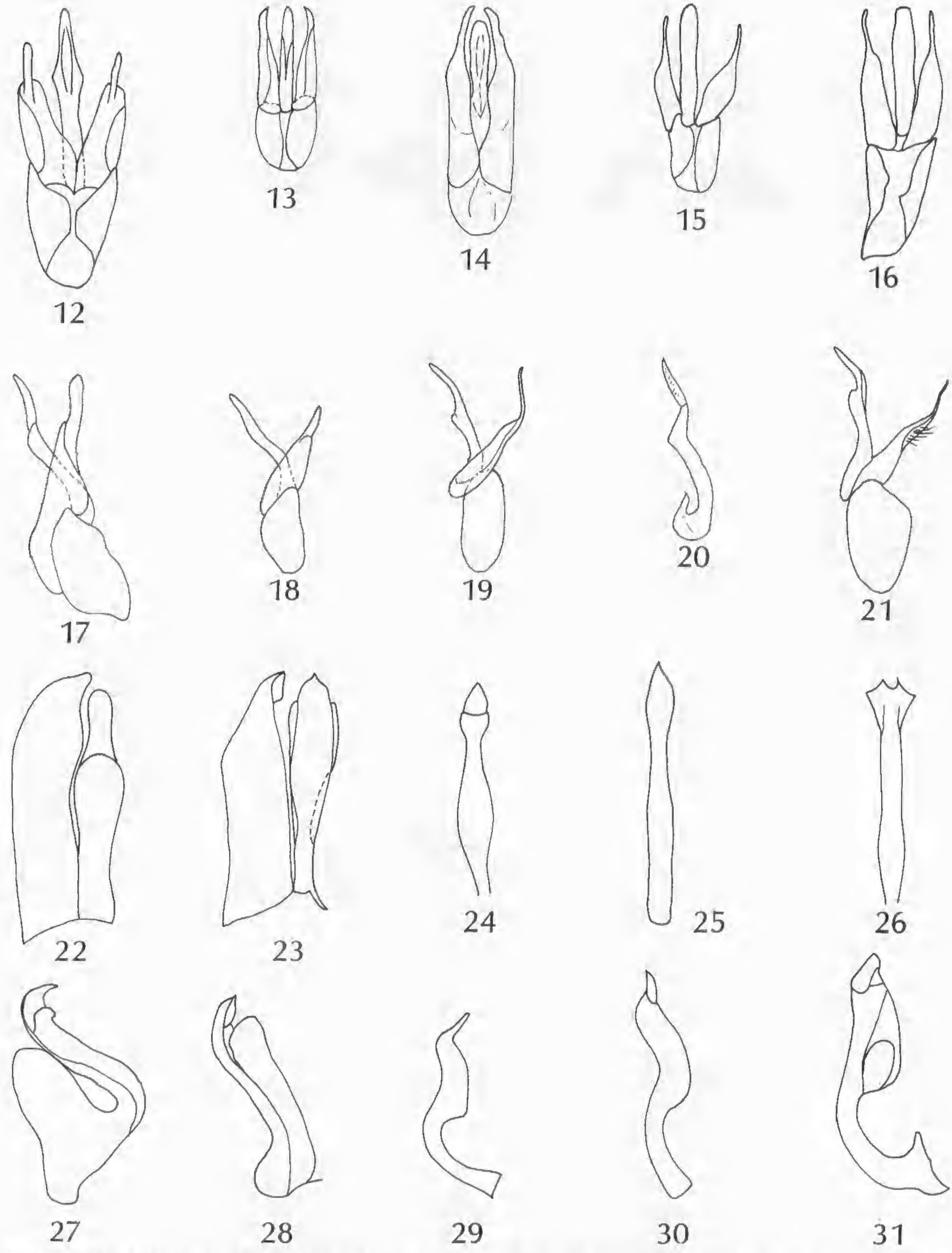
(Figs 10, 12, 17)

Berosus approximans Fairmaire, 1879, p. 82.

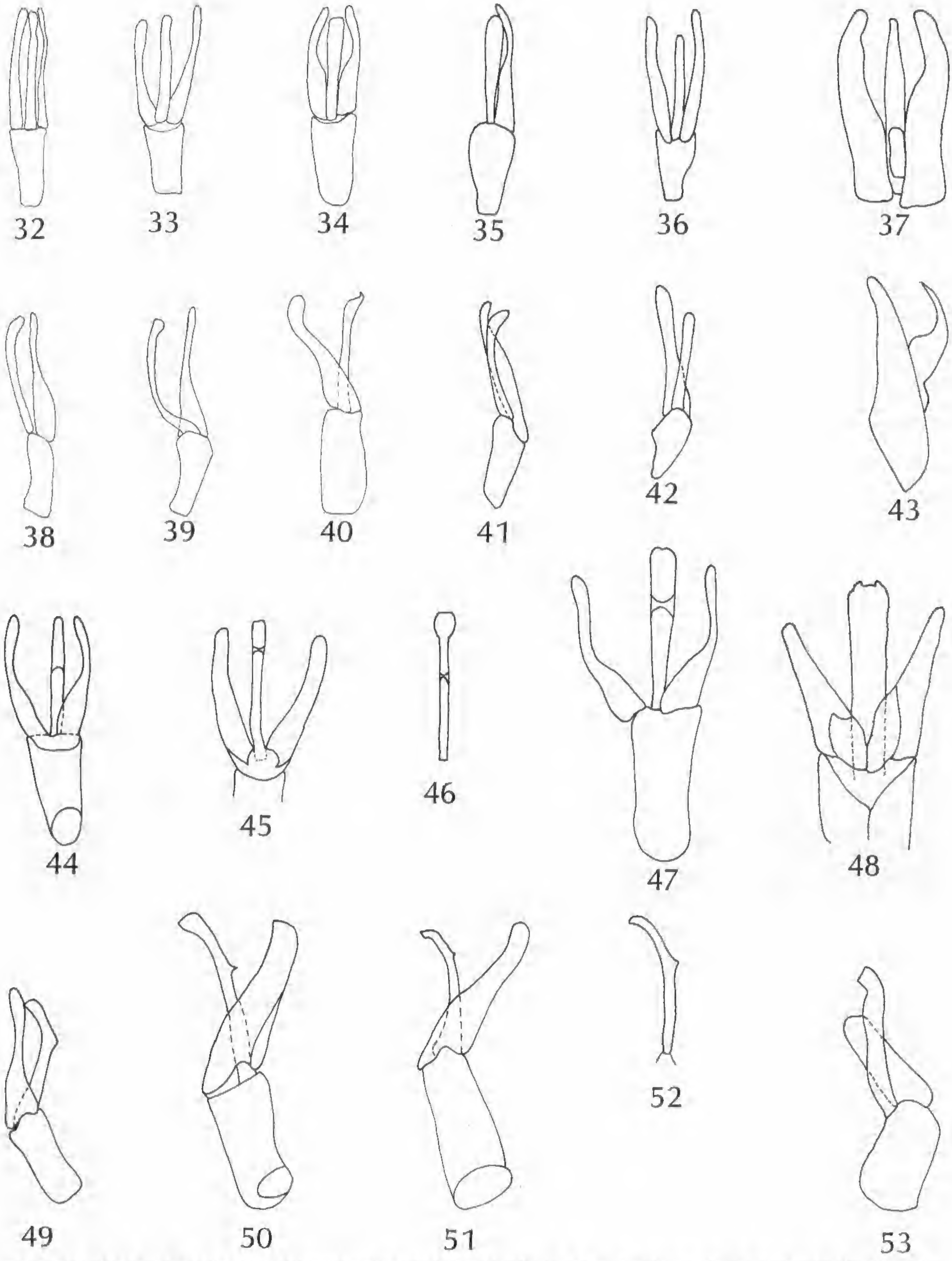
Berosus ovipennis Fairmaire, 1879, p. 82, syn. nov.



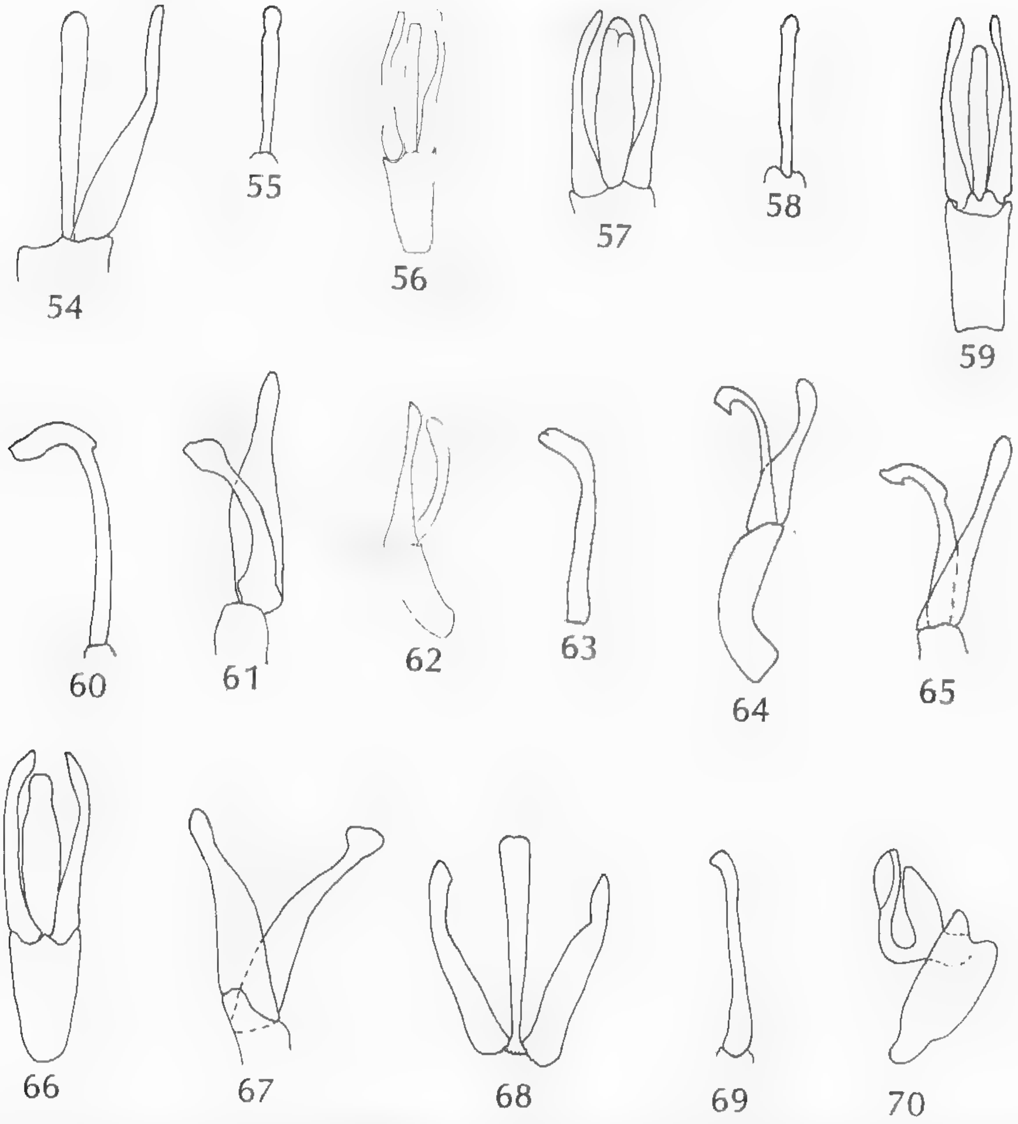
FIGURES 1-11. 1, Midventral region of *B. nicholasi*; 2, midventral region of *B. discolor*; 3, apex of elytra of *B. munitipennis*; 4, ditto, *B. munitipennis*; 5, pronotum of *B. nutans*; 6, pronotum of *B. gibbae* showing punctation on disc; 7, pronotum of *B. arcus* showing punctation on disc; 8, lateral view of elytron of *B. arcus*; 9, lateral view of elytron of *B. involutus*; 10, lateral view of *B. approximans* showing pronotal pillar (shaded); 11, elytron of *B. majusculus* showing punctation of disc.



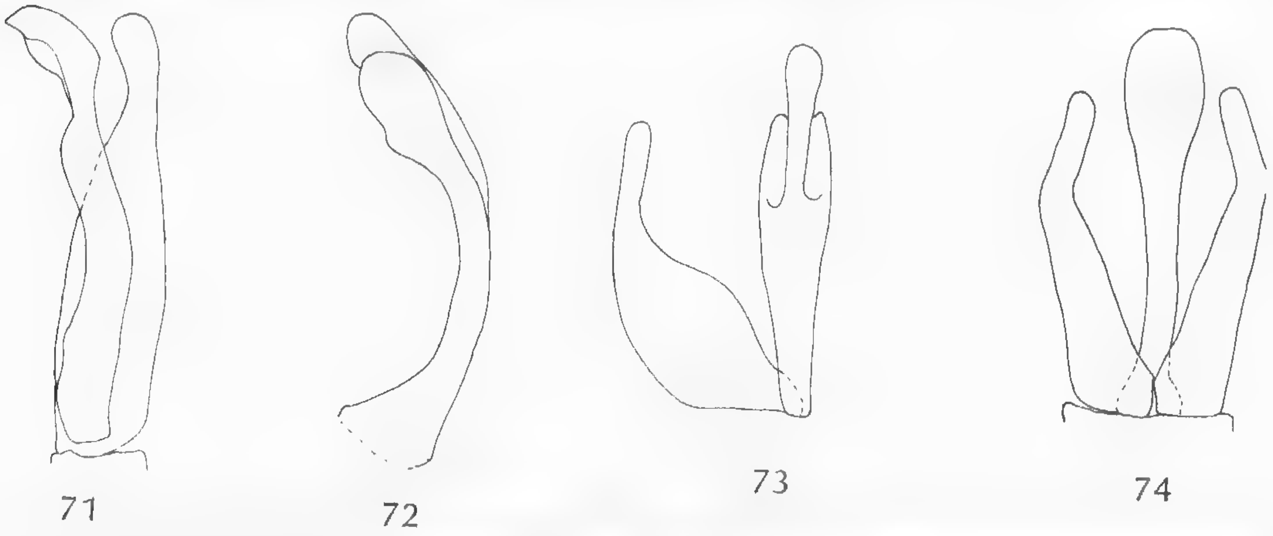
FIGURES 12–31. 12, dorsal view of male genitalia of *B. approximans*; 13, ditto, *B. discolor*; 14, ditto, *B. juxtadiscolor*; 15, ditto, *B. reardoni*; 16, ditto, *B. timmsi*; 17, lateral view of male genitalia of *B. approximans*; 18, ditto,*B. discolor*; 19, ditto, *B. juxtadiscolor*; 20, ditto, *B. reardoni*; 21, ditto, *B. timmsi*; 22, dorsal view of aedeagus and right paramere of *B. duplopunctatus*; 23, ditto, *B. queenslandicus*; 24, dorsal view of aedeagus of *B. arcus*; 25, ditto, *B. niger;* 26, ditto, *B. involutans*; 27, lateral view of aedeagus of *B. duplopunctatus*; 28, ditto, *B. queenslandicus*; 29, ditto *B. arcus*; 30, ditto, *B. niger*; 31, ditto, *B. involutans.*



FIGURES 32–53. 32, dorsal view of male genitalia of *B. dallasi*; 33, ditto, *B. gibbae*; 34, ditto, *B. aquilo*; 35, ditto, *B. vijae*; 36, ditto, *B. subovatus*; 37, *B. trishae*; 38, lateral view of male genitalia of *B. dallasae*; 39, ditto, *B. gibbae*; 40, ditto, *B. aquilo*; 41, ditto, *B. vijae*; 42, ditto, *B. subovatus*; 43, ditto, *B. trishae*; 44, dorsal view of male genitalia of *B. debilipennis* (thin form); 45, ditto, *B. debilipennis* (thick form); 46, ditto, *B. sadieae*; 47, ditto, *B. decipiens*; 48, ditto, *B. pulchellus*; 49, ventral view of male genitalia of *B. debilipennis* (thin form); 50, ditto, *B. sadieae*; 51, *B. debilipennis* (thick form); 52, ditto, *B. decipiens*; 53, ditto, *B. pulchellus*.



FIGURES 54-70. 54, dorsal view of male genitalia of *B. majusculus*; 55, ditto, *B. josephenae*; 56, ditto, *B. amoenus*; 57, ditto, *B. nutans*; 58, ditto, *B. munitipennis*; 59, ditto, *B. macumbensis*; 60, lateral view of male genitalia of *B. majusculus*; 61, ditto, *B. josephenae*; 62, ditto, *B. amoenus*; 63, ditto, *B. nutans*; 64, ditto, *B. munitipennis*; 65, ditto, *B. macumbensis*; 66, dorsal view of male genitalia of *B. nicholasi*; 67, lateral view of male genitalia of *B. veronicae*; 68, dorsal, *B. veronicae*; 69, lateral, *B. nicholasi*; 70, lateral, *B. macropunctatus*.



FIGURES 71-74. 71, lateral view of male genitalia of *B. australiae*; 72, ditto, *B. ralphi*; 73, dorsal view of male genitalia of *B. ralphi*; 74, ditto, *B. australiae*.

Berosus stigmaticollis Fairmaire, 1879, p. 82, syn. nov.
Berosus simulans Blackburn, 1888(1889), p. 832, syn. nov.
Berosus auriceps Blackburn, 1889(1890), p. 447, syn. nov.
Berosus blackburni Zaitz, 1908 p. 358, nom. nov. for *B. auriceps*.

Types
B. approximans. Holotype, male, Peak Downs, N.T. in MNHN, seen.
B. stigmaticollis. Holotype, female, Peak Downs, N.T. in MNHN, seen.
B. ovipennis. Holotype, female, Pt Mackay, in MNHN, seen.
B. auriceps. Holotype, male, Northern Territory, in BM(NH), seen.
B. simulans. Holotype, male, Rivoli Bay, S.A. in SAM, seen.

Description (number examined 134)
Length 3.0–5.2 mm. Narrowly oval, elytra moderately humped, higher behind middle where it is 1/3 higher than at humeral angle. Apex of elytron rounded or produced into a small, widely triangular spine. Head black, shiny, metallic. Pronotum brown with broad central panel darker, dark portion usually not reaching front or rear edges and often with lighter area in midline, shiny. Elytron brown, with striae, punctures and a few spots, black, shiny. Ventral surface black, appendages lighter. Rugose portions of femora variable from light to dark-brown. Punctures on head strong, regular, well-impressed, most less than 1/2 puncture width apart. Punctures on pronotum similarly sized but less dense. Weaker on disc. Elytral striae well-impressed. Second stria on elytron 1/4 length of elytron. Punctures in striae and between them approximately the same size, as strong laterally as on disc. Reticulation of elytron variable, virtually absent in some, in others very strong and almost masking punctures, especially laterally. Ventral surface densely rugose punctate. Mesosternal keel strongly produced downwards forming a pillar. Front edge almost perpendicular to body, ventral edge straight, or concave in some specimens, with the front portion projecting downwards as much or further than rear portion. Lateral lobes of metacoxa raised, bluntly pointed, midline produced backwards in a point, small oval depression in midline devoid of sculpture. Keel in midline of first abdominal segment well-marked, reaching 1/4–3/4 segment. Rugose portion of metafemur 1/2–2/3 length of femur. Meso- and meta-tibiae strongly spined. Apical abdominal segment weakly and widely notched.
Male: Protarsi four-segmented, first segment moderately expanded. Head narrower than in female.

Remarks
A southern species slightly larger than *B. flindersi*. Readily separated from that species by the larger area of rugose sculpture on the femora. The notch on the last abdominal segment is also broader and weaker in *B. approximans*. Differs from *B. juxtadiscolor* and *B. reardoni* from northern Australia by having a smaller amount of rugose sculpture on the femora than in these species, in the generally strongly elytral punctures and in characters of the aedeagus. Its wide distribution, variability in size and in the strength of the dorsal punctation has led to it being described a number of times by earlier authors.

Distribution (Fig. 76)
Southern coastal Australia from Kimberley, W.A., to Rockhampton, Qld.

Berosus reardoni sp. nov.
(Figs 15, 20)

Description (number examined 7)
Length 3.2–4.5 mm. Narrowly oval, elytra moderately humpbacked, highest behind middle where it is 1.4 × height at shoulders. Apex of elytron bluntly pointed. Head shiny, black. Pronotum yellow-brown with two longitudinal black strips adjacent to midline, dark portions not reaching front or hind margin. Elytron yellow-brown with striae and many punctures on head strong, regular, well-impressed, most less than 1/2 a puncture-width apart. Punctures on pronotum moderately dense and strong laterally, weaker and sparser on disc. Dorsal surface weakly to moderately reticulate. Elytral striae well-impressed, less so on disc, second stria on elytron a little less than 1/4 length of elytron. Punctures in striae somewhat larger than those in interstriae, shallower and slightly larger laterally. Mesosternal pillar long, well-developed, ventral edge concave. Ventral surface densely rugose-punctate. Metacoxal process broad, lateral lobes lowered slightly, diverging towards rear, deeply and broadly pitted in centre, weakly triangularly produced backward in midline. Apical abdominal segment notched. Rugose portion of metafemur 2/3 length of femur, that of mesofemur between 1/2–2/3, that of profemur about 1/3 length of femur on hind edge.

Male: Protarsi four segmented. First segment moderately expanded.

Remarks
This northern member of the *approximans* species group closely resembles *B. juxtadiscolor*, but differs in being lighter in colour, particularly the rugose portions of the femora, and in the shape of the aedeagus and parameres.

Distribution (Fig. 75)
Northern N.T.

Types
Holotype male 'Katherine, N.T., at light 9.11.68 J. A. L. Watson', in ANIC.

Berosus juxtadiscolor sp. nov.
(Figs 14, 19)

Description (number examined 18)
Length 3.5–5.0 mm. Narrowly oval. Elytra weakly humpbacked, highest behind middle where it is 1.2 × height at shoulder. Apex of elytron rounded. Head shiny black. Pronotum dark yellow-brown with two central longitudinal stripes darker. Elytron darkish yellow-brown with punctures and striae darker, in many individuals elytron almost completely dark. Ventral surface dark-brown, appendages other than rugose portion of femurs somewhat lighter. Punctures on head strong, regular and well-impressed, most less than 1/2 a puncture-width apart. Punctures on pronotum moderately dense and strong laterally, weaker and sparser on disc. Dorsal surface weakly to moderately reticulate. Elytral striae well-impressed, less so on disc. Second stria on elytron a little less than a 1/4 length of elytron. Punctures in striae slightly larger than those in interstriae. Punctures stronger towards sides. Interstriae not arranged in a single row. Mesosternal pillar long, well-developed, ventral edge slopes downwards towards rear, sharply pointed on ventral rear angle, ventral surface densely but shallowly rugose-punctate. Metacoxal process broad, squarish, lateral lobes weakly lowered, deeply and broadly pitted in centre, triangularly produced backwards in midline. Midline keel in first abdominal segment moderately developed in front half. Apical abdominal segment notched. Rugose portion of metafemur 2/3 length of femur, that of mesofemur a little over 1/2, that of profemur about 1/3 on hind edge.

Male: Protarsi four-segmented. First segment moderately expanded, second segment small; third segment long and thin about length of first and second segment.

Remarks
This species closely resembles *B. reardoni* but has a more complexly shaped paramere and differently shaped aedeagus. It seems to be a darker species than *B. reardoni* which has the rugose portions of the femora the same colour as rest of leg. Only a few specimens of *B. reardoni* are known. A clearer idea of the relationships between these two species must await the collection of further material. The greater extent of rugosity on the legs separates it from the otherwise quite similar *B. discolor*.

Types
Holotype, male, '11 09'S 132 09'E, Black Point, Cobourg, N.T., 15–23 Feb., 1977. J. A. Weir', in ANIC. Paratypes: six, same data as holotype, in ANIC; one, same data as holotype, in CW; two, 'Howard Springs, N.T., light 27.i.68, J. A. L. Watson', in ANIC.

Distribution (Fig. 77). At present known only from the coastal areas of the N.T.

Berosus timmsi sp. nov.
(Figs 16, 21)

Description (number examined seven)
Length 3.4–4.0 mm. Oval, elytron weakly humped, highest behind middle where it is approximately 1.2 × height of shoulder. Apex of elytron rounded or weakly truncated. Head black, shiny, metallic. Pronotum yellowish with central panel dark-brown, shiny, metallic. Elytron shiny yellow-brown, with striae, punctures and a few spots black. Ventral surface dark-brown to black, appendages brown except for rugose portions of meso and metafemura which are darker. Punctures on ventral surface moderately large, dense. Punctures on head strong, regular, well-impressed, most at rear of head less than 1/2 puncture-width apart. Punctures on pronotum strong, variable in size particularly laterally, less dense than on head, well-impressed. Elytral striae well-impressed, with strong tendency for the inner edge of striae to be sharper than outer. Second stria on elytron 1/4 length of elytron. Punctures in striae strong and little larger than largest on pronotum. Interstrial punctures small, subobsolete over most of elytron. Mesosternal keel moderately developed, pillar well-developed, concave and denticulate on ventral edge, front and rear projections largest. Metacoxal process projecting backwards in midline, lateral lobes weakly raised, pointed behind, weakly converging towards front, a wide shiny diamond shaped depression in midline. Keel in midline of first abdominal segment moderately strong reaching across most of segment. Rugose portion of metafemur approximately 2/3 length of femur, that on mesofemur approximately 1/2, that on profemur 1/2–1/3 length of femur. Meso- and metatibiae strongly spined. Apical abdominal segment with strong deep wide notch to about 1/2 distance of normally visible portion of segment.

Male: Protarsi four-segmented, first segment strongly expanded. Metafemur with distinct triangular bulge in lower hind margin midway along rugose portion.

Female: Metafemur of some specimens show slight thickening in same area as in male.

Remarks
This species resembles the more widespread *B. juxtadiscolor* with which it is sympatric, but differs from it (and all other *Berosus*) by the shape

of the male metafemur which is reminiscent of the femora of some male Dytiscids of the genus *Antiporus*. The variably-sized pronotal punctures and very small interstrial punctures also separate it from *B. juxtadiscolor* and *B. reardoni*.

Distribution (Fig. 82)
Known only from the type locality at the tip of Cape York, Qld.

Types
Holotype, male, 'Bamaga, Qld, 29/6/83, Timms', in SAM. Seven paratypes, same data as holotype: one male, one female, in ANIC; one male, three females in CW.

Berosus niger sp. nov.
(Figs 25, 30)

Description (number examined seven)
Length 3.3–4.0 mm. Oval. Elytra parallel-sided, humpbacked, highest just behind the middle where it is 1.5 × the height at the shoulders. Apex of elytron not spined. Black, portions of elytral interstriae in apical half and appendages of head, dark yellow-brown. Head and pronotum with large, dense, moderately-impressed punctures. Pronotum with some scattered much smaller punctures in spaces between larger punctures. Strial punctures large, shallow. Interstrial punctures weak, ill-defined, lacking laterally and apically. Second striae approximately 1/2 length of elytron. Spaces between elytral striae 8 and 9, 9 and 10, and 10 and 11 greater in the middle of elytron than elsewhere. Elytral striae 1, 3, 4, 5, 6, 7, 8 and 11 ridged, pronouncedly so on stria 8. The strongly-ridged stria 8 bends sharply towards apex where it is about 90° to the edge of elytron when viewed laterally. Ventral surface rugose-punctate. Mesosternal pillar long, ventral edge weakly concave, anterior ventral angle with very small spine. Metacoxal process broad, squarish, with large pit in midline; projecting backwards sharply in midline, continued forwards in midline by well-marked ridge. Midline keel on first abdominal segment strongly raised for whole length of segment. Apical abdominal segment moderately notched, lateral flanges moderately developed. Rugose portion of metafemur reaching 1/2 way on posterior edge and a little less on anterior edge, rugose portion of mesofemur about 1/3 length of femur, that on profemur very small.

Male: Protarsi four-segmented. Basal segments not expanded, first segment somewhat longer than second and third which are subequal in size.

Remarks
A north-eastern highlands species. Readily separated from similar species by the almost completely black colour and the form of the lateral striae on the elytron.

Distribution (Fig. 75)
Mountainous areas on east coast north of Townsville, Qld.

Types
Holotype, male, 'Star Valley lookout c. 5 km W of Paluma Qld, 3.vii.67, at light, J. G. Brooks', in ANIC. Paratypes: one, '13.6M up Whitfield Ra. Rd., Cairns, 3/11/70, J. G. Brooks', in ANIC; one, 'Tinaroo Ck., N.Q. 1/73 A.W.H.', in ANIC; one 'Mt. Spec, N.Q. 11/73 G.B.', in ANIC; one, '7.8M. NW Paluma, NQ 5.11.73 J. G. Brooks, in ANIC; two, 'Australia N.Qld. Windsor Tableland via Mt. Carbine 11-12 Jan 1980 R. I. Store', in QPI.

Berosus involutus (W. MacLeay)
(Figs 9, 26, 31)

Hygrotrophus involutus W. MacLeay, 1873 p. 132.

Types
There are four specimens from Gayndah, Qld in ANIC (on loan from the MacLeay Museum), labelled 'Syntypes'. Two of these are *B. pulchellus* and two *B. approximans*. The original description does not indicate how many specimens MacLeay had before him. Apart from the locality there is little to connect these insects with a type series of *B. involutus*. Two specimens labelled '*Hygrotrophus involutus* M. L. W. Gayndah', mounted on the same card, are in the AM labelled 'Holotype' and numbered K19531. They agree well with the brief description and belong to the species that subsequent workers such as Blackburn and Lea have identified as *B. involutus*. I therefore herein designate the left-hand specimen as the lectotype of *Hygrotrophus involutus* W. MacLeay, 1873.

Description (number examined 475)
Length 3.5–4.5 mm. Oval, elytra humpbacked, highest just behind middle where about 1.5 × height at shoulder. Apex of elytron rounded. Head and most of pronotum black, with metallic sheen. Front and side margins of pronotum yellow-brown, occasionally lacking, elytron brown, punctures and striae and variable number of markings black. Ventral surface black. Appendages light-brown, tip of labial palpi and rugose portions of meso- and metafemora black. Head and pronotum with dense large evenly-sized nearly confluent punctures. Interstrial punctures on elytron large and well-marked, almost touching, those towards sides and humeral angles larger and squarer. Interstrial puncture small, shallow, strongest on disc, obsolete laterally. Second stria approximately half length of

elytron. Distance between striae seven and eight and eight and nine often slightly greater in middle, other striae approximately equidistant from each other. Ventral surface rugose-punctate. Mesosternal keel in form of a long pillar, with a small downward point at front edge. Metacoxal process broad, sides raised, subparallel, deeply and broadly pitted in middle, pit devoid of sculpture, projecting backward sharply for short distance in midline, lobed. Midline keel of first abdominal segment strongly raised for whole width of segment. Apical abdominal segment broadly notched with well-developed lateral flanges, a pair of very small tubercules on edge of middle of notch. Rugose portion of metafemur dark, reaching 1/2–2/3 along femur on anterior edge, not as far on posterior edge

Male: Protarsi four-segmented. Segments not expanded, basal three subequal in size.

Remarks

A common species in clear streams and pools in the Great Dividing Range from Vic. to north Qld. Many specimens from the higher areas of Vic. and N.S.W. are darker in colour and lack the distinctive yellow margins on the pronotum. Separated from the two related species, *B. niger* and *B. arcus*, by the lack of strongly raised and bowed seventh elytral stria. It is also noticeably larger than *B. arcus* and is different in colour from *B. niger*. It is only in the northern portion of its range that *B. involutus* is sympatric with these two similar species.

Distribution (Fig. 76)

Coastal eastern Australia from southern Cape York to south-eastern Vic.

Berosus arcus sp. nov.
(Figs 8, 24, 29)

Description (number examined 149)

Length 1.5–3.4 mm. Oval, elytra humpbacked, highest just behind middle where about 1.2 × height at shoulder. Apex of elytron without spines. Black, elytral interstriae, edges of pronotum apart from central portion of rear margin, appendages apart from tip of labial palpi and rugose portions of meso and metafemora yellow-brown. Head and pronotum with dense strong evenly-sized and spaced punctures. Strial punctures on elytron large, almost touching. Interstrial punctures large but very shallow, stronger on disc than laterally. Second stria on elytron approximately 1/2 length of elytron. Distance between striae eight and nine greatly enlarged in middle to about twice distance between striae nine and ten, which is also slightly enlarged in middle. Stria eight moderately carinate in middle section where distance from stria nine greatest. Ventral surface rugose-punctate. Mesosternal keel in wide pillar, anterior ventral angle of pillar sharply produced downward into small sharp point. Metacoxal process broad, squarish, sides raised, subparallel, deeply and widely pitted in midline, projecting backwards sharply in midline. Midline keel on first abdominal segment strongly raised for whole length of segment. Apical abdominal segment broadly notched with well-developed lateral flanges. Rugose portion of metafemur reaching nearly 2/3 along posterior edge of femur and 1/3 on anterior edge, that on mesofemur reaching a little over 1/2 length of femur on posterior edge, 1/3 on anterior edge, that on profemur 1/3 on posterior edge and less than 1/4 on anterior edge.

Male: Protarsi four-segmented, basal three segments subequal in size.

Remarks

A northern species confined to the streams and riverside pools of the ranges around and to the north of the Atherton Tableland. Smaller than *B. involutus* and *B. niger* and readily separated from them by colour and the form of the eighth elytral stria.

Distribution (Fig. 79)

Ranges of southern Cape York and Atherton Tableland, Qld.

Types

Holotype, male, '5 mi. N. Bloomfield Rn., N.Q. 7–9. May 1970 S. R. Curtis', in ANIC. Paratypes, 11 same data as Holotype, in ANIC; one same data, in CW.

Berosus trishae sp. nov.
(Figs 37, 43)

Description (number examined 39)

Length 2.4–4.5 mm. Oval. Elytra parallel-sided, humpbacked, highest just behind middle where it is 1.2 × higher than at shoulders. Apex of elytron rounded. Yellow-brown, head, three rough broad longitudinal patches on pronotum, about a dozen small patches on elytron and vague areas of ventral surface darker. Head and pronotum moderately covered with large strong punctures. A single even row of slightly smaller punctures along front and rear edges of pronotum. Strial punctures on elytron very large, almost confluent, strongest laterally where they are almost square. Interstrial areas shiny lacking punctures except apically in interstria 3. Second elytral stria a little more than 1/2 length of elytron. Interstrial areas raised somewhat towards apex of elytron. Ventral surface moderately punctate. Mesosternal keel produced in robust pillar, ventral edge of pillar convex. Metacoxal process very broad, parallel sided, central portion with wide pit, lateral lobes project downwards at about 35°, narrowly and triangularly produced backwards in midline. Midline keel on first abdominal segment strongly raised for whole length of segment. Apical abdominal segment widely and deeply notched with well-developed lateral flanges. Rugose portion of metafemur about 2/3 length of femur, that on mesofemur 1/2–2/3, and that on profemur about 1/2 length of femur.

Male: Protarsi four-segmented, basal segments not expanded.

Remarks

A northern species. Separated from the quite similar *B. quadrupunctatus* by the greater extent of rugose sculpture on the femura and characters of the aedeagus. The sculpture on the head is a little rougher than in *B. quadrupunctatus* and the punctures on pronotum and elytra are smaller. Although this size difference is clearly evident in direct comparisons of most specimens, I have been unable to quantify it to enable the character to be used to separate the species. Most specimens are < 3.5 mm long but a female from Charters Towers, Qld., in NSWD, is considerably larger at 4.5 mm. I can detect no other difference from N.T. specimens

Distribution (Fig 80)

Darwin area, N.T., Atherton Tableland and, Charters Towers Qld.

Types

Holotype, female, 'N.T. Lake Bennett area c. 25 km S.E. of Manton Dam 29–30 Dec. 1979, M. B. Mallpatil', in NTM. Paratypes; 20, 'N.T., Ck. in Holmes Jungle 13.1.1980 M. Malapatil', in NTM, two same data in CW.

Berosus macropunctatus sp. nov.

(Fig. 70)

Description (number examined two)

Length 3.0–3.6 mm. Oval. Sides of elytra subparallel, humpbacked, highest about 1/3 distance from apex of elytra where it is about 1.2 × height at shoulders. Apex of elytron squarish. Yellow-brown, head and pronotum black except for narrow yellowish band on lateral and hind edges, elytron with scattered darker patches. Head and pronotum strongly rugose-punctate. Strial punctures on elytron large, larger and squarish towards sides. Interstrial areas shiny, impunctate except for a row of very small setae-bearing punctures towards apex of third interstria. Lateral three interstrial areas raised into weak ridges. Interstrial areas at extreme apex weakly raised. Ventral surface strongly rugose-punctate. Mesosternal keel produced into a narrow pillar. Ventral edge of pillar slopes downwards towards rear and has a small downward pointing spine on ventral anterior angle. Metacoxal process very broad, lateral lobes parallel sided, rather narrow, separated by wide pit in centre of process, open towards rear, lateral lobes slope downwards at about 20°, broadly triangularly produced backwards in midline. Midline keel of first abdominal segment strongly developed over whole length of segment, ventral edge serrate, apical abdominal segment deeply and widely notched with well-developed lateral flanges. Rugose portion of metafemur 3/4 length of femur, that of mesofemur a little less than 3/4, that on profemur 1/2 length of femur.

Male: Protarsi four-segmented, basal segments not expanded.

Remarks

A distinctive species readily separated from *B. trishae* and *B. quadrupunctatus* by the strongly rugose-punctate black head and pronotum.

Distribution (Fig. 76) (N.T. type localities only.)

Types

Holotype, male, 'Burrell's Ck Stuart H'way N.T. 24 Nov, 1972 D.H. Colless', in ANIC. Paratype, one, 13°15'S, 131°06'E, Adelaide River, N.T., 16.x.72. M. S. Upton', in ANIC.

Berosus quadrupunctatus sp. nov.

Description (number examined 4)

Length 3.2–3.9 mm. Elytra humpbacked, highest just behind middle where it is 1.3 × height at shoulders. Apex of elytron rounded, weakly flanged. Yellow-brown with head black and three broad vague longitudinal patches on pronotum, scattered patches on elytron and patches in the midline ventrally, darker, shiny. Head and pronotum moderately covered with large well-impressed punctures. Elytron with strial punctures very strong, particularly laterally where they are square. Punctures in adjacent lateral striae almost touch. Interstrial areas shiny, lacking punctures except for some minute setae-bearing ones towards apex in interstria three. Second elytral stria reaches a little over 1/2 length of elytron. Interstrial areas towards extreme apex become strongly raised. Ventral surface covered with numerous large but separate rugose punctures. Mesosternal keel produced into a narrow pillar, concave on ventral edge. Metacoxal process very broad, parallel-sided with large pit in midline, narrowly triangular, projecting backwards in midline, lateral lobes slope downwards at about 45°. Keel on first abdominal segment strongly raised for whole length of segment, serrate on ventral edge. Apical abdominal segment broadly notched, with well-developed lateral flanges. Rugose portion of metafemur a little over 1/2 length of femur, that on mesofemur a little under 1/2, that on profemur 1/3 length of femur.

Male: Protarsi four-segmented, basal segments not expanded.

Remarks

A little known species differing from *B. trishae* by the less well-developed rugose sculpture on the femora and in the more uniform sculpture on head. A female specimen from Charters Towers, Qld.,(in NSWDA) may belong to this species. It is longer (4.5 mm), the rugose portion on the femora is a little greater, the sculpture on the head is rougher with some scattered very small punctures as in *B. trishae*. In these characters it is intermediate between *B. trishae* and *B. quadrapunctatus*.

Distribution (Fig. 80)

Known only from the type series from McArthur River, N.T.

Types

Holotype, male, 'McArthur River, 16°47'S 135°45'E, 14 km S by W of Cape Crawford, N.T., 25 Oct. 1975 M. S. Upton, in ANIC. Paratypes, three, same data as holotype, in ANIC.

Berosus queenslandicus Blackburn
(Figs 23, 28)

Berosus queenslandicus Blackburn, 1898, p. 223.
Berosus quartinus d'Orchymont, 1943, p. 6, syn. nov.

Types

B. queenslandicus, holotype female, Qld., in BM(NH), seen. Paratype, female damaged, in SAM, seen. *B. quartinus*, holotype, male, and paratype, in MNHN.

Description (number examined 42)

Length 4.2–6.3 mm. Oval, elytra humpbacked, approximately twice as high just behind middle as at shoulder. Apex of elytron rounded. Head black with metallic sheen. Pronotum shiny, widely black or dark-brown in midline, brown at sides. Elytron shiny, brown with dark-brown to black mottlings. Ventral surface mottled dark-brown and black, appendages brown, apical segment of labial palpi darker, rugose portions of meso- and meta femora dark-brown to black. Punctures on head large, subequal except for clypeal margin where they are smaller, those on disc separated by about 1/2 their width, a few scattered very small punctures in some specimens. Head with small midline ridge on back, sometime lacking. Punctures on pronotum as on head, closer together laterally. Punctures in elytral striae well-marked almost confluent in any one stria, stronger towards front. Interstrial areas virtually impunctate except for small area of large punctures on humeral angles. In some specimens some very shallow small punctures can be seen in some lights in interstriae on disc. Striae weakly impressed on disc, stronger laterally and apically. Second stria on elytron reaching 2/3 length of elytron. Striae approximately equidistant from each other. Ventral surface rugose-punctate. Mesosternal keel in form of high narrow pillar, ventral edge concave, keel on midline of mesosternum forward of pillar weak. Midline keel on first abdominal segment well-marked, reaching almost completely across segment but weakening rapidly towards rear. Metacoxal process broad with well-marked lateral lobes, sides subparallel, with depressed shiny impunctate area in midline. Rugose portion of metafemur about 1/3 length of femur, ending in relatively straight edge across most of femur, that on metafemur 1/3, that on profemur 1/3 length of femur on hind edge. Apical abdominal segment deeply notched in midline with lateral flanges to notch.

Male: Protarsi four-segmented, basal segments subequal not expanded.

Remarks

Separated from the superficially similar *B. duplopunctatus* by the slightly larger and differently shaped rugose portions on femora, the virtual lack of smaller punctures on head and pronotum and the virtual lack of interstrial punctures. Some specimens have some minute punctures in between the large ones on the head and to a lesser extent on the pronotum, but these are much smaller and fewer than those in *B. duplopunctatus*. Synonomy based on d'Orchmont's description and illustration of male genitalia.

Distribution (Fig. 78)

Coastal south-eastern Australia from Caloundra, Qld., to Adelaide, S.A.

Berosus duplopunctatus Blackburn
(Figs 22, 27)

Berosus duplopunctatus Blackburn, 1888 (1889), p. 828.

Types

Holotype, female, Pt Lincoln, S.A. in BM(NH), seen. Paratype, female, Pt Lincoln, S.A. in SAM, seen.

Description (number examined 109)

Length 4.5–6.4 mm. Oval, elytra humpbacked, at highest point just behind middle about 1.5 × height at shoulder. Apex of elytron rounded. Head relatively wide, black, shiny with metallic sheen. Midline of pronotum black, sides brown. Elytron predominantly brown with punctures outlined in black plus some black spots, extent of black varies between specimens and is the dominant colour in many. Ventral surface black, appendages light-brown, tip of apical segment of labial palpi black, rugose portions of meso- and metafemora black. Head densely punctate with both large and small punctures. Pronotum with large and small punctures, less dense than on head. Punctures in elytral striae well-impressed, almost confluent, stronger towards front, about as strong on disc as laterally. Interstrial punctures shallow, small, numerous, scattered, very weak laterally. Striae moderately impressed, slightly weaker on disc. Striae approximately equidistant apart. Second stria on elytron reaches to 3/4 length of elytron. Humeral angle of elytron serrate due to large punctures close to edge. Ventral surface strongly rugose-punctate. Mesosternal keel in form of high narrow pillar, weakly concave on ventral edge, keel in front of pillar weak. Midline keel on first abdominal segment well-marked in front half, weaker in hind half of segment. Apical abdominal segment deeply notched, notch with lateral flanges. Metacoxal process with well marked lateral lobes, converging towards rear and with small shiny impunctate depressed area in midline. Rugose portion of mesofemur about 1/3 length of femur on hind edge, about 1/4 length on front edge of femur, that on hind edge of metafemur 1/4, that on profemur 1/4 length of femur.

Male: Protarsi four-segmented, basal three subequal not expanded.

Remarks
Readily separated from the superficially similar *B. queenslandicus* by the punctate elytral interstriae and the presence of small punctures on the pronotum.

Distribution (Fig. 80)
Coastal eastern Australia from Sydney, N.S.W. to Kangaroo Island, S.A.; Tas.

Berosus nutans (W. MacLeay)
(Figs 5, 57, 63)

Hygrotrophus nutans W. MacLeay, 1873, p. 132.
Berosus pallidulus Fairmaire, 1879, p. 81, syn, after Blackburn, 1898, p. 222.

Types
Two syntypes labelled 'Gayndah' and mounted on the same card are in the ANIC. The left-hand side specimen, a female, is here designated as lectotype.

Description (number examined 440)
Length 4.2-8.8 mm. Elongate oval, not humpbacked. Apex of elytron rounded or obliquely truncated. Dorsal surface brown with vague darker markings particularly on head and pronotum. Elytron with striae darker. Ventral surface dark-brown to black, appendages brown to dark-brown except for darker tip of labial palpi. Apex of abdomen occasionally brown. Punctures on head well-marked, weaker towards front, transversely elongate. Sculpture on pronotum consists of a close network of fine transverse grooves which cover most of the surface, all but obscuring punctures which themselves tend to be transversely elongate as on head. A fine reticulation is also present on some specimens. Scutellum sculptured as pronotum. Elytron with striae lacking or only weakly impressed, their position often outlined by rows of small transversely expanded, darkly pigmented spots. Elytron densely and evenly covered with short rather stout setae, each seta arising from a small shallow transverse groove. Ventral surface shallowly rugose-punctate with small setae arising from each puncture. Mesosternum with weak keel in midline, extended quite strongly backwards between mesocoxae. Midline of first abdominal segment with moderate keel in front 1/4. Metacoxal process raised, sharply triangular with elongate oval area in midline devoid of sculpture. Rugose portion of metafemur 3/4 length of femur, that of mesofemur 2/3, that of profemur 1/2 length of femur.

Male: Protarsi four-segmented, basal segment expanded, about as long as second and third segment combined, second segment expanded, same length as simple third segment.

Remarks
A common and widespread inland species, readily recognised by the unique sculpture of the pronotum.

Distribution (Fig. 78)
Coastal and southern inland Australia.

Berosus pulchellus W. S. Macleay
(Figs 48, 53)

Berosus pulchellus W. S. Macleay, 1825, p. 35.
Hygrotrophus devisi Blackburn, 1898, p. 225, syn after d'Orchymont 1943, p. 421.

Types
B. pulchellus, Java, location unknown. *B. devisi*, holotype, ? female, Qld., in BM(NH), seen

Description (number examined 233)
Length 2.8-4.8 mm. Elongate oval, elytra not humpbacked. Apex of elytron rounded. Head

black, shiny. Pronotum light-brown with front edge narrowly black and usually with wide central panel black, black area not reaching rear border and often with portion of midline narrowly light-brown. Elytral striae often darker. Ventral surface black, appendages light-brown except extreme apex of labial palpi which is darker. Head evenly punctate with moderately dense small punctures, punctures somewhat weaker towards front. Pronotum moderately and evenly covered with small punctures. Elytron strongly and evenly covered with similarly sized punctures, each puncture with a well-marked seta. Elytral striae lacking or very weakly impressed. Punctures in elytral striae same size as interstrial punctures and difficult to distinguish from them. Ventral surface evenly, shallowly rugose-punctate. Midline of prosternum with weak but well-marked keel, weakly projecting backwards between mesocoxae. Midline of first abdominal segment weakly raised in front half. Metacoxal process bluntly triangular, raised, midline with narrow oval area devoid of punctures. Apical abdominal segment deeply notched. Rugose portions of meta and mesofemora 3/4 length of femura, that on profemur 2/3–3/4 length of femur.

Male: Protarsi four-segmented, basal two segments moderately expanded, basal segment about twice length of second which is about same length as third.

Remarks
This widespread and common species is readily separated from all other Australian *Berosus* by the small size, black head and virtual lack of elytral striae. It is most commonly collected from the sandy pools formed during the dry season in the beds of the major northern and eastern river systems. It has recently been collected in numbers in sewerage settlement pits at Whyalla, S.A., an unusual habitat and a long way from its normal range.

Distribution (Fig. 82)
Tropical Australia; Whyalla, S.A.; Asia.

Berosus dallasae sp. nov.
(Figs 32, 38, 70)

Description (number examined 80)
Length 3.8–6.8 mm. Elongate oval. Elytra not humpbacked. Head and pronotum shiny, elytron rugosely reticulate. Apex of elytron produced into two spines, outer one usually strongly and widely developed, inner often small or even vestigal. Dorsal surface light yellow-brown, rough patches on head, pronotum and elytron darker, elytron stria darker. Ventral surface dark-brown, appendages lighter, tip of lapial palpi dark. Head evenly and strongly punctate, punctures much larger than eye facet, much weaker towards front. Pronotum evenly punctate with large strong regular punctures except for some smaller areas along front and rear margin. Punctures on disc have a tendency to become longitudinally elongate. Elytral striae strongly impressed. Stria 2 with punctures a little smaller than those on pronotum and about twice size of those in adjacent interstriae. Interstrial punctures evenly, densely but shallowly impressed over whole elytron, each puncture bearing a small seta. Ventral surface rugose-punctate. Midline of mesosternum weakly and broadly carinate, moderately projected backwards. Midline of first abdominal segment weakly carinate in front 1/4. Metacoxal process broadly triangular, midline weakly carinate in front of a small diamond-shaped area in centre, devoid of sculpture and bounded on front sides by weak edges. Rugose portion of metafemur 3/4 length of femur, that on mesofemur 2/3–3/4 that on profemur 1/2–2/3 length of femur.

Male: Protarsi four-segmented. Basal two segments moderately expanded, first segment about 1.5 × length of second which is a little larger than the narrow third segment.

Remarks
This widespread species of northern Australia is readily separated from the two other, equally widespread, species with setose elytral punctures, by the lack of strongly transversely elongate pronotal punctures (from *B. nutans*), and lack of a black head (from *B. pulchellus*).

Distribution (Fig. 75)
Tropical Australia.

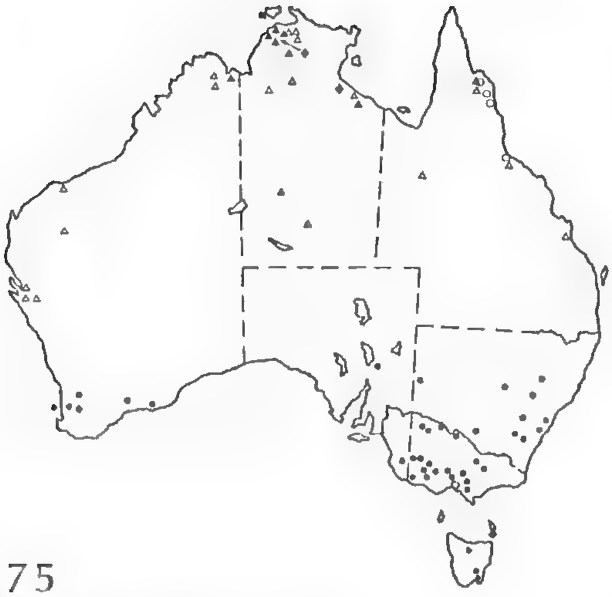
Types
Holotype, male, '1 km N. of Millstream, W.A. (21°35'S 177°04'E), 9-10.iv.1975, M. S. Upton', in ANIC. Paratypes, nine same data as holotype, in ANIC; one same data as holotype, in CW.

Berosus macumbensis Blackburn
(Figs 59, 65)

Berosus macumbensis Blackburn, 1896, p. 259.

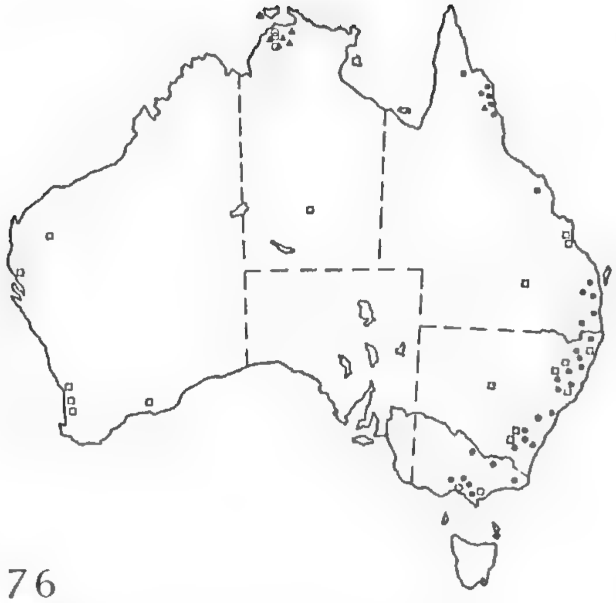
Types
Holotype, male, Macumba Creek, S.A. in BM(NH), seen.

Description (number examined 150)
Length 5.6–7.8 mm. Elongate oval, not humpbacked. Apex of elytron with two spines, the inner usually small and the outer as long as the distance between the two spines. Elytra shiny. Dorsal surface light brown to brown with dark mottlings. Elytral striae and punctures on disc darker. Ventral surface dark-brown to black. Appendages brown except for extreme tip of labial palpi which



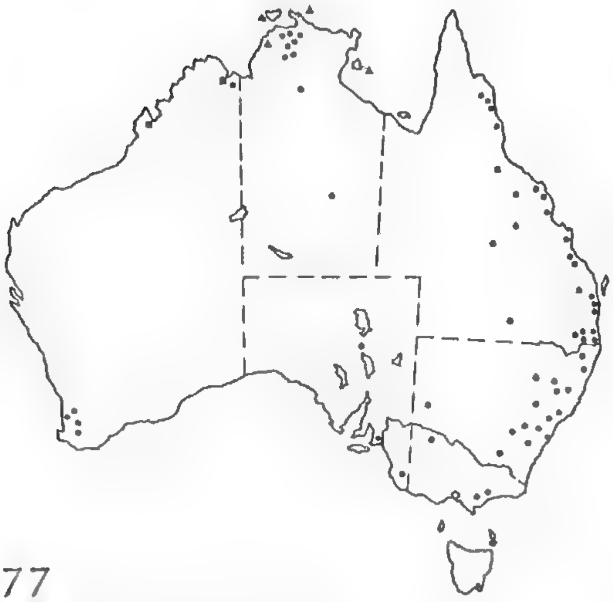
75

● B. majusculus
▲ B. vijae
△ B. dallasae
○ B. niger
◆ B. reardoni



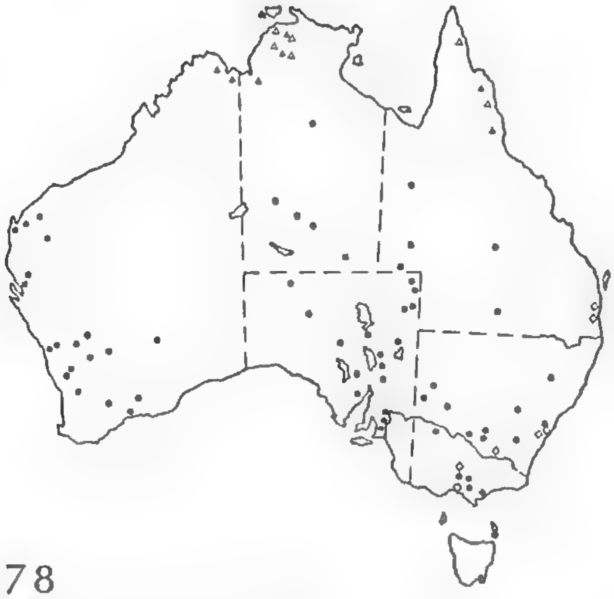
76

● B. involutus
○ B. macropunctatus
▲ B. josephenae
□ B. approximans



77

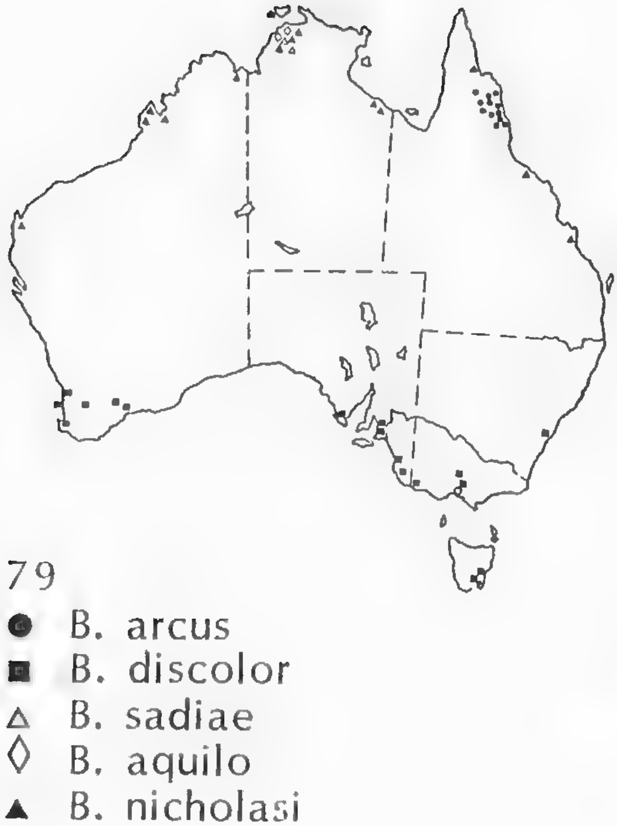
● B. australiae
▲ B. juxtadiscolor
■ B. ralphi



78

● B. nutans
▲ B. gibbae
△ B. decipiens
◊ B. queenslandicus

FIGURES 75–78. Distribution maps for Australian *Berosus* spp.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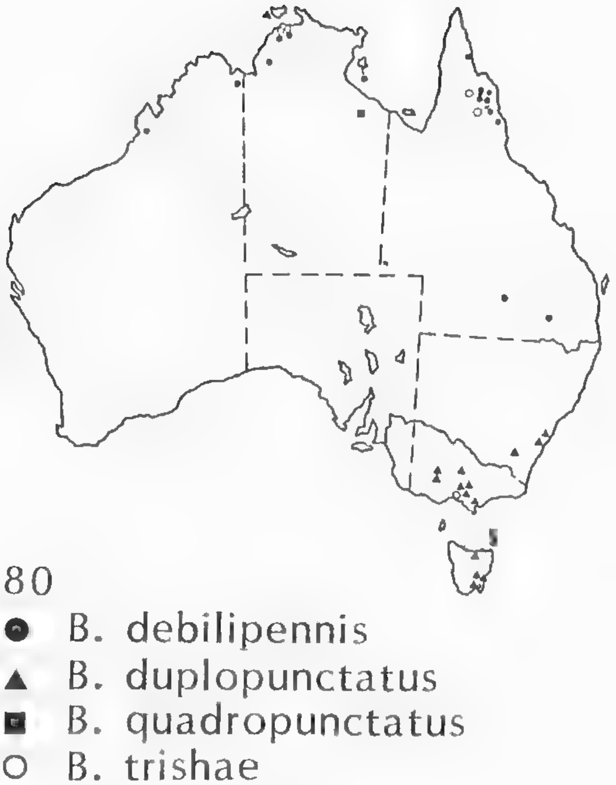
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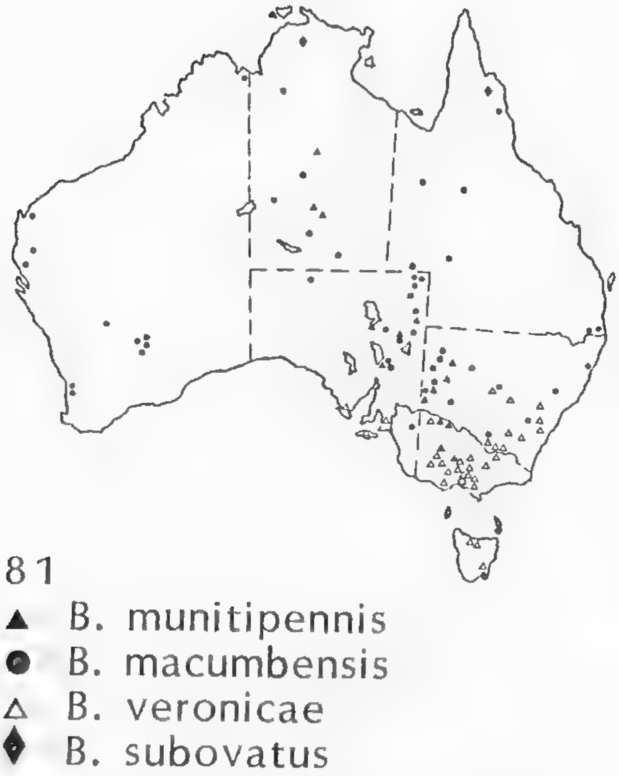
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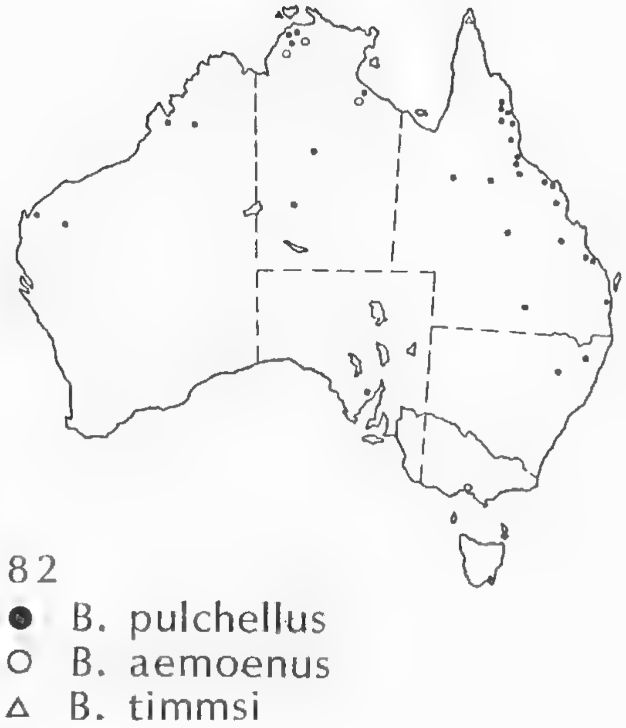
82

FIGURES 79–82. Distribution maps for Australian *Berosus* spp. (cont.).

is darker. Head strongly and evenly punctate except towards front where punctures are considerably smaller and weaker. Punctures on pronotum uneven in size and often with a rather patchy distribution. A row of very small punctures along front and rear margins. Elytral striae weakly impressed, for the most part reduced to a row of well-impressed punctures about the size of the larger punctures on pronotum. Interstrial punctures on disc markedly smaller than those on sides of elytra; in no case is there a tendency for interstrial punctures to form a single row. Interstrial punctures on disc tend to be uneven in size. Underside densely rugose-punctate. Midline of mesosternum with weak rather rounded keel, projecting a little distance backwards. Midline of first abdominal segment with little or no keel. Metacoxal process raised, triangular, a narrow diamond or oval-shaped area devoid of sculpture in the midline. Rugose portion of metafemur 1/2 to 2/3 length of femur, that on mesofemur a little over 1/2 and on profemur a 1/3 to a 1/2 length of femur.

Male: Protarsi four-segmented, basal two segments expanded, basal segment larger than second; second and third segment subequal in length.

Remarks

A widespread inland species readily recognized from the other large *Berosus* by the pattern of punctation on the elytra, where the outer punctures are much stronger than the inner punctures.

Distribution (Fig. 81)

Inland Australia.

Berosus munitipennis Blackburn
(Figs 3, 58, 64)

Berosus munitipennis Blackburn, 1895, p. 30.

Types

Holotype, ?male, Lake Callabonna, S.A., in BM(NH), seen.

Description (number examined 48)

Length 4.8–6.6 mm. Elongate oval, not humpbacked. Apex of elytron with very long narrow outer spine and short inner spine, outer usually longer than distance between spine bases. Light-brown, pronotum and head slightly darker than elytra. Suture lines and some punctures usually black on elytron disc. Ventral surface dark-brown to black; appendages brown, tip of labial palpi darker. Head moderately to quite densely covered with punctures, large and well-marked in basal half, smaller towards front. Elytron shiny or with weak to moderate reticulation. Pronotum sparsely or moderately and rather unevenly covered with variably sized, well-marked punctures, front and rear margins with only a few shallow small punctures. Elytral striae weakly to moderately impressed, often reduced over much of disc to a row of punctures. Serial punctures about same size as larger ones on pronotum. Interstrial punctures sparse, shallow, lacking completely over much of elytra in some specimens, where present tend to be arranged in single row. Second elytrae stria less than 1/4 length of elytron. Ventral surface shallowly rugose punctate. Midline of mesosternum weakly carinate, weakly extended backward. Midline of first abdominal segment weakly carinate in basal 1/2 or 1/4. Metacoxal process triangularly-raised, with patch in midline without sculpture, patch bounded at rear by a slight V-shaped ridge extended backwards in midline to tip of process. Rugose portion of metafemur 1/3–2/3 length of femur, that of mesofemur 1/4–1/2, that on profemur 1/3 length of femur along ventral edge.

Male: Basal two segments of protarsi moderately expanded. First segment about 2 x length of second, which is about the same length as the third.

Remarks

An inland species readily recognized by the long, thin, outer elytral spines and virtual lack of an inner one, and the weak development of sculpture on the elytra. This latter character tends to be more marked in central and northern specimens compared with those from Vic. The contrast of the pale upper side and black ventral surface in most specimens is quite striking. The extent of rugosity on the femora is particularly variable in this species.

Distribution (Fig. 81)

Inland Australia south of Barrow Creek, N.T.

Berosus amoenus sp. nov.
(Figs 56, 62)

Distribution (number examined nine)

Length 3.3–4.5 mm. Elongate oval. Weakly reticulate in some specimens. Elytra not humpbacked. Apex of elytron truncated, spines vestigial. Dorsal surface dark-brown to black, edges of pronotum and elytron yellow-brown, sides of elytron with three pale patches extending inwards from sides, the apical ones more distinct. Disc of elytron variegated yellow and brown-black. Ventral surface dark-brown, appendages a little lighter, apex of labial palpi dark-brown. Head sparsely covered with strong punctures, about 1.5 x size of eye facet, those towards front much smaller. Pronotum moderately but unevenly covered with strong punctures, a little larger than those on head, punctures tending to be elongate longitudinally, a few isolated smaller punctures along front and rear margins, elytral striae moderately to strongly impressed. Second stria on elytron with 11 to 16 punctures. Punctures in striae, between striae and on pronotum subequal in size. Interstrial punctures lateral to stria 9 approximately arranged in one line. Ventral surface rugose-punctate. Midline of mesosternum weakly raised, moderately projecting backwards. Midline of first abdominal segment weakly carinate in front 1/4. Metacoxal process raised, triangularly produced backwards with a short narrow keel in midline at extreme rear and small narrowly oval area in middle devoid of sculpture. Rugose portion of metafemur 2/3 × length of femur, that of mesofemur 1/2–2/3 that of profemur 1/4–1/2 length of femur.

Male: Protarsi four-segmented, basal two segments broadly expanded, basal longer than second which is a little longer than the small third segment. Apical abdominal segment entire.

Remarks

A rare species from coastal N.T., readily recognised by the black head and predominantly black pronotum. The size and black head resemble the *B. approximans* group of species but the unlobed metacoxal process and lack of mesosternal pillar separate it from that group.

Distribution (Fig 82)

Coastal N.T.

Types

Holotype, male '12°52'S, 132°50'E Koongarra, 15 km E of Mt. Cahill, N.T. 15.xi.1972, M. S. Upton', in ANIC. Paratypes; two, '16°28'S, 136°09'E 46 km SSW of Borroloola, N.T. 28 Oct, 1975. M. S. Upton', in ANIC; six, 'King River N.T. W. McLennan Pres. H. L. White 17.10.16', in NMV.

Berosus josephenae sp. nov.

(Figs 55, 61)

Description (number examined 19)

Length 5.5–6.0 mm. Elongate oval. Elytra not humpbacked. Apex of elytron weakly to quite strongly produced backwards, ending in two spines, the outer well-developed, the inner much less so. Dorsal surface light-brown, with patches on head, centre of pronotum, elytron, inner striae and punctures on elytron darker. Ventral surface dark brown-black, appendages lighter, rugose portions of meso and metafemora and tip of labial palpi dark brown-black. Head strongly punctate, punctures larger than eye facets, punctures weakening towards front. Pronotum strongly densely and evenly punctate, punctures of one size except for a few smaller ones on extreme front and rear edges. Elytral striae strongly impressed. Stria 2 with 15 to 23 punctures about size of those on pronotum and 1.5 to 3 × size of those in adjacent interstrial area. Interstrial punctures relatively large, uniform in size, well impressed, arranged in more than one row over most of elytron, larger but shallower towards sides. Ventral surface strongly rugose-punctate. Midline of mesosternum weakly to moderately carinate, moderately projected backwards. Midline of first abdominal segment raised in front third. Metacoxal process raised, triangularly produced backwards, weakly ridged in midline except for a broadly diamond-shaped area in centre which is devoid of sculpture. Rugose portion of metafemur 2/3–3/4 length of femur, that of mesofemur 1/2–2/3, that of profemur about 1/2 length of femur.

Male: Protarsi four-segmented, basal segments moderately expanded, basal segment much longer than second segment which is about same length as much narrower third segment. Apical abdominal segment entire.

Remarks

As yet known only by a few specimens from coastal N.T., this rather elongate species is distinguished by its strong even punctation on the pronotum and the black rugose portions of the femora.

Distribution (Fig. 76)

Coastal N.T. and Cape York, Qld.

Types

Holotype, male, '12°23'S 132°57'E 5 km NNW of Cahills Crossing, N.T. East Alligator River, vi. 73, Upton & Fochan', in ANIC. Paratypes; six, two same data as holotype, in ANIC; one, 'Mareeba 22.v.1976 K. & E. Carnaby' in CW.; one, 'N.T. Junction of Arnhem Hwy & Oenpelli Road M.V. light 26–27 June 1980 M. B. Malipatil', in NTM; one, 'N.T. Lake Bennett area c. 25 km SE of Manton Dam 29–30 Dec. 1979. M. B. Malipatil', in NTM.

Berosus gibbae sp. nov.

(Figs 33, 39)

Description (number examined 17)

Length 4.0–5.0 mm. Elongate oval. Elytra not humpbacked. Shiny but with elytron of many specimens with a fine-meshed reticulation. Apex of elytron with a stout moderately-sized outer spine and a virtually absent inner one. Dorsal surface light-brown, elytral punctures and many striae and vague patches on head, pronotum and elytron darker. Ventral surface dark-brown, appendages lighter, except tip of labial palpi which is dark-brown. Head moderately densely covered with strong punctures, strong, 2 × size of eye facets except towards front where they become much smaller. Pronotum evenly and quite densely covered with strong punctures, the same size as those at rear of head, a few smaller ones along front and rear margins. Elytral striae moderately impressed, with punctures the same size or slightly smaller than those on pronotum. Second elytron stria with 12 to 18 punctures. Punctures in interstriae smaller than those in striae, larger but shallowly impressed towards side, over most of elytron arranged in one or two irregular lines, often bearing a single seta particularly those towards sides. Punctures in interstria 3 of uniform size. Ventral surface densely but finely rugose-punctate. Midline of mesosternum strongly raised, moderately projecting backwards. Midline of first abdominal segment weakly carinate in front 1/2-1/4. Metacoxal process raised, triangularly produced backwards, with a broad diamond-shaped area in middle devoid of sculpture. Rugose portion of metafemur 2/3-3/4 length of femur, that of mesofemur 2/3, that of profemur about 1/2 length of femur on rear face.

Male: Protarsi four-segmented, basal segments weakly expanded. Basal segment longer than second, second and third segments subequal in all dimensions. Apical abdominal segment broadly but shallowly notched.

Remarks
This widespread northern species is rare in collections. The peculiar fine sculpture of the elytra, which is either irregular or with a fine grained reticulation, and the presence of a large number of setae- bearing punctures, are reminiscent of *B. nutans* and *B. dallasae* which show these characters to a greater extent. The more normal pattern of elytral punctation readily separates it from these species, in which the elytra are densely and evenly covered with punctures. The round rather than elongate pronotal punctures also separate it from these otherwise quite similar species. The light-coloured rugose portions of the femora separate it from *B. josephenae*.

Distribution (Fig. 78)
Coastal northern Australia.

Types
Holotype, male, 'N.T. Katherine low level Native Park, 25 Ap. 1980 M. B. Malipatil', in NTM. Paratypes; six, two same data as holotype in NTM; four 'N.T. N. P. Korlonjotlok Stream 18 Nov. 1979 M. B. Malipatil', in NTM.

Berosus majusculus Blackburn
(Figs 54, 60)

Berosus majusculus Blackburn, 1888 (1889), p. 824.

Types
Holotype and paratype in BM(NH), seen. Paratype, male, Adelaide, S.A. in SAM, seen.

Description (number examined 336)
Length 6.0-8.7 mm. Elongate oval, elytra not humpbacked. Apex of elytron with two well-developed spines, the outer longer than the inner. Dorsal surface brown with darker mottlings. Elytral punctures and striae black, strongly so on disc, weaker or absent on sides. Ventral surface black. Appendages brown, tip of labial palpi darker. Head relatively narrow, evenly strongly and quite closely punctate, punctures much weaker towards front. Pronotum unevenly covered with moderately dense, well-marked punctures, variable in size, a little stronger laterally with a row of small punctures along front and rear margins. Elytral striae well-impressed, second stria 1/4 length of elytra. Punctures in striae well-marked, same size or larger than those on pronotum, interstrial punctures not in one line except in some lateral interstriae, well-marked, a little smaller than those in striae, particularly on humeral angles. Reticulation of elytron absent to moderately strong. Ventral surface densely and evenly rugose-punctate. Midline of mesosternum tending to form weak keel, weakly projecting backwards. Midline of first abdominal segment with weak keel in anterior 1/4. Metacoxal process raised, narrowly triangular. Midline with long narrow area devoid of sculpture. Rugose portion of metafemur 1/2 to 2/3 length of femur, that on mesofemur a little over 1/3 along ventral face, that on profemur about 1/3 length of femur along ventral face.

Male: Protarsi four-segmented, basal two segments dilated. Basal segment about twice length of subequal second and third segments. Apical abdominal segment notched.

Remarks
This common southern species is readily separated from the rather similar *B. australiae* by lack of black rugose, femore. It is more difficult to separate from *B. veronicae*, with which it is generally sympatric, but it is larger and has a greater number of punctures on stria 2. The notch on the last abdominal segment of the male also separates this species from others of its size.

Distribution (Fig. 75)
Southern coastal Australia from Perth to Sydney areas.

Berosus veronicae sp. nov.
(Figs 67, 68)

Description (number examined 209)

Length 3.5–6.4 mm. Elongate oval, elytra not humpbacked. Apex of elytron with two weak blunt spines. Dorsal surface light-brown with darker mottlings. Elytral punctures and striae black, strongly so on disc in many specimens, weakly or not at all laterally. Ventral surface black, appendages light-brown, tip of labial palpi a little darker. Head evenly, strongly and quite closely punctate. Punctures toward front weaker. Pronotum evenly, strongly and quite closely punctate, scattered smaller punctures particularly on disc and front and rear margins, weakly reticulate in some. Elytron variably reticulate from none to moderate. Elytral striae well impressed. Second stria about 1/4 length of elytra. Strial punctures about size of larger punctures on pronotum. Interstriae 1 to 5 scattered, those between more lateral striae tending to be in one row except for extreme lateral edge. Ventral surface densely rugose-punctate. Midline of prosternum weakly and evenly keeled, projecting backwards in weak prosternal process. Midline of first abdominal segment weakly keeled in anterior 1/4. Metacoxal process raised, triangular, midline with diamond-shaped area devoid of sculpture in middle and slight keel to the rear of this area. Rugose portion of metafemur between 1/3 and 1/2 length of femur, that on mesofemur 1/3, that on profemur 1/4 length of femur.

Male: Protarsi four-segmented, basal two segments moderately expanded. First segment about twice length (and size) of second, which is a little longer than the narrow third segment. Apical abdominal segment entire.

Remarks
A common species in southern Australia, this species has frequently been mis-identified in collections, usually as *B. majusculus*. The unnotched apical segment in the male separates it from this species. The smaller size and fewer punctures in the area between the first two elytral striae will separate all but the occasional specimens. *B. albipes* Fauvel is another name that has been attached to specimens of this species but this is a species from New Caledonia with different aedeagus and other characters.

Distribution (Fig. 81)
South-eastern Australia, Tas.

Types
Holotype, male, 'Goulburn', in SAM. Paratypes, 13 same data as the holotype, in SAM; two, 'Albury N.S.W. 1/61 CW', in CW.

Berosus australiae Mulsant
(Figs 71, 74)

Berosus australiae Mulsant, 1859, p. 58.
Berosus externespinosus Fairmaire, 1879, p. 81, syn. after D'Orchymont, 1943.
Berosus gravis Blackburn, 1888 (89), p. 826, syn. nov.

Types
Berosus australiae, not located (Hope, Dept of Ent. Oxford, records it as having been sent to BM(NH) in 1925). Type locality 'Australia'.
Berosus gravis: Holotype, male, S.A., in BM(NH), seen. Paratype, male, in SAM, seen. Paratype, male, in SAM, seen. Type locality (Paratype), Murray Bridge, S.A.
Berosus externespinosus, not located (?MHNH). Type locality, Rockhampton, Qld.

Description (number examined 455)
Length 6.5–9.0 mm. Elongate oval, not humpbacked. Apex of elytron with two spines, the outer strong and usually about two times length of inner. Dorsal surface brown to dark-brown with darker motlings. Elytral striae and punctures outlined in black except for punctures laterally. Ventral surface black. Appendages brown, rugose portion of femora black or dark- brown. Punctures on head moderately strong and dense, much weaker towards front. Pronotum moderately covered with well-marked variable sized punctures, front and rear edges with rows of closely spaced small punctures. Elytron with striae moderately impressed, strial punctures relatively small, about same size as those on pronotum. Interstrial punctures scattered, smaller, those in more lateral interstriae tending to form a single line to varying degrees. Elytron surface shiny or weakly to moderately reticulate with a fine reticulation. Ventral surface densely rugose-punctate. Midline of mesosternum raised into weak keel, weakly projecting backwards. Midline of first abdominal segment weakly keeled in front 1/4. Metacoxal process raised, triangular, with diamond shaped area devoid of sculpture in midline. Rugose portion of metafemur 2/3–3/4 length of femur, that on mesofemur a little more than 1/2, that on profemur about 1/3 length of femur.

Male: Protarsi four-segmented, basal two segments strongly expanded, basal segment about 1.5 × length of second, which is much longer than the small third segment. Apical abdominal segment entire.

Remarks
In southern and eastern Australia this large common species is readily recognized by the black rugose portions of the femora. In northern Australia some specimens have the rugose portions dark-brown and not greatly darker than the rest of the leg, and closely resemble *B. sadieae* and *B. decipiens*. Separation of these three species is best

done on aedeagi as, although *B. australiae* is generally larger, and generally has stronger elytral punctures, this is not always so.

Distribution (Fig. 77)
Virtually Australia-wide, more common in south-east than elsewhere, rare in W.A., apparently absent from centre and north of that state.

Berosus decipiens Blackburn
(Figs 47, 52)

Berosus decipiens Blackburn, 1888, p. 827.

Types
Holotype and paratype in BM(NH), seen. Paratype in SAM, seen.

Description (number examined 18)
Length 6.1-8.0 mm. Elongate oval, not humpbacked. Apex of elytron with two weak spines placed close together. Reddish-brown with elytral striae and punctures on elytron and pronotum black, particularly on discs, black areas on elytron coalesced in some specimens to give extensive black areas on disc. Ventral surface black, appendages reddish-brown, rugose portions of femora darker. Head moderately punctate with rather shallow punctures, those in front half smaller. Pronotum sparsely and rather unevenly punctate with small to moderately-sized rather shallow punctures. Front and rear boarders with row of shallow small punctures. Elytral striae weakly impressed especially on disc where for most part reduced to a line of punctures. Strial punctures about same size as the large punctures on pronotum. Interstrial punctures sparse and shallow, those on disc smaller (usually much smaller) than those in adjacent striae, weaker laterally, strong tendency for interstrial punctures to be arranged in one line over most of elytron, in interstriae 3 and 5 there are some scattered larger punctures. Ventral surface rugose-punctate. Midline of mesosternum quite strongly and sharply carinate, weakly projecting backwards. Midline of first abdominal segment without keel. Metacoxal process raised, triangular with rather bowed sides. Midline weakly carinate behind, with narrow area in middle unsculptured. Rugose portion of metafemur 1/2-2/3 length of femur; that of mesofemur about 1/2, that of profemur a little over 1/2 length of femur.

Male: Protarsi four-segmented, basal two segments moderately expanded. First segment about 1.5 × length of second segment which is a little shorter than the narrow third segment.

Remarks
B. decipiens is a northern coastal species resembling *B. australiae*. It differs from that species by generally being a little smaller and more elongate, and by the weaker and less numerous punctures on elytra and pronotum. The aedeagus and the much larger third segment of the male protarsi separate it from *B. australiae*. I have found no characters that separate this species from *B. sadleae* other than the aedeagus.

Distribution (Fig. 78)
Coastal northern Australia from Wyndham, W.A., to Kuranda, Qld.

Berosus sadleae sp. nov.
(Figs 46, 50)

Description (number examined 2)
Length 4.5-5.0 mm. Narrowly oval. Shiny. Elytron not humpbacked. Apex of elytron with two weak spines, the inner one smaller than the outer. Dorsal surface light-brown, punctures on elytron and pronotum, elytral striae and patches on pronotum and elytron darker. Rear of head dark, centre and front lighter. Ventral surface dark-brown, appendages lighter, rugose portions of meso and metafemora somewhat darker than rest of legs. Tip of labial palpi dark. Head relatively narrow, relatively sparsely covered with well impressed punctures, about size of eye facet, smaller towards front. Pronotum sparsely covered with punctures, most about 1.5 × puncture width apart, towards midline and in front punctures vary in size. Elytral striae weakly to moderately impressed, strial punctures about size of the larger ones on pronotum. Interstrial punctures smaller. In interstriae 3 and 5 there are some scattered larger punctures. Punctures lateral to about stria 7 weak and arranged in one row, those inward of about stria 7 stronger and tend to be scattered. Stria 2 with 11 to 15 punctures which are about twice as large as those in adjacent interstrial areas. Ventral surface densely punctate. Midline of mesosternum raised, moderately projected backwards. Midline of first abdominal segment weakly raised in front 1/3. Metacoxal process raised, broadly triangularly produced backwards, with small wide diamond shaped portion in middle devoid of sculpture. Rugose portion of metafemur 2/3 length of femur, that of mesofemur 1/2-2/3, that of profemur 1/2 length of femur.

Male: Protarsi four-segmented, basal segment weakly expanded, first segment larger than second which is same length but a little wider than third. Last abdominal segment entire.

Remarks
A northern species known for certain only from the two male types. These are indistinguishable from *B. decipiens* except for the distinctive aedeagus. Both species have been taken together at Howard Springs, N.T., and Lake Bennet, N.T. Further work

is needed to clarify the relationship of this northern group which also includes *B. australiae* and *B. aquilo*. A series of specimens from Lake Bennet, N.T., Dec. 1979, in NTM, includes both *B. sudieae* and *B. decipiens* but most are teneral which precludes extraction of an identifiable aedeagus, hence I cannot be sure to which species various individuals belong.

Distribution (Fig. 79)
Known only from the type localities.

Types
Holotype, male, 'Howard Springs, N.T., at light, 27.i.68, E. Matthews', in ANIC. Paratype, male, 'N.T., Lake Bennett area c. 25 km SE of Manton Dam, 29–30 Dec. 1979, M. B. Malipatil at M.V. light', in NTM

Berosus aquilo sp. nov.
(Figs 34, 40)

Description (number examined 11)
Length 3.3–5.0 mm. Elongate oval. Elytra not humpbacked. Shiny. Apex of elytron with two spines, outer weakly to moderately developed, inner one often lacking. Dorsal surface light-brown, punctures and striae on elytron darker, elytron with one or two darker patches, rear of head darker. Ventral surface dark-brown and black. Appendages lighter, rugose portions of femora dark-brown to black. Head moderately covered with strong punctures about the same size as facets of the eye or slightly larger, much smaller towards front. Pronotal punctures same size as those at rear of head, rather unevenly distributed, all approximately the same size except for a few smaller ones along extreme front margin and on disc. Elytral striae moderately impressed, stronger towards sides and apex. Interstrial punctures smaller than those in striae, arranged in one line over most of elytron, except between striae 1 to 3 and 4 to 5. Area between striae 2 and 3 with a few larger punctures. Second elytral stria with 10 to 16 punctures which are about 3 × size of those in adjacent interstrial areas. Ventral surface densely rugose-punctate. Midline of mesosternum raised, moderately produced backwards. Midline of first abdominal segment carinate in front third. Metacoxal process raised, broadly triangularly produced backwards, midline weakly carinate; a small diamond-shaped area in centre devoid of sculpture. Rugose portion of metafemur 3/4 length of femur, that of mesofemur, 2/3, that of profemur 1/2–2/3 length of femur.

Male: Protarsi four-segmented, basal two segments strongly expanded, basal segment larger than second which is about same length as the unexpanded third.

Remarks
A small dark species from coastal N.T. The only small species in this grouping with the rugose portions of the femora darker than the rest of the femur; and usually almost black.

Distribution (Fig. 79)
Known only from the type locality and from Daly River Mission, N.T. (ANIC).

Types
Holotype, male, 'Coastal Plains Research Station, C.S.I.R.O. Darwin, N.T. at light, 30.v.66 E.C.B. Langfield', in ANIC. Paratypes, nine same data as holotype, seven in ANIC, two in CW.

Berosus vijae sp. nov.
(Figs 35, 41)

Description (number examined 31)
Length 3.0–4.5 mm. Narrowly oval, not humpbacked, apex of elytron with two weak broad spines. Yellow-brown, rear of head, areas adjacent to eyes, elytral striae, 2–3 vague patches behind middle of elytron, ventral surface except for appendages darker. Shiny. Head sparsely punctured with variably sized punctures, sparser and weaker towards front and centre. Pronotum sparsely punctured with variably sized but quite well impressed punctures, stronger and denser laterally, front and rear margins with a single row of small punctures irregularly spaced. Elytral striae moderately to quite strongly impressed, particularly towards apex of elytron. Punctures in striae well marked, about same size as the larger ones on pronotum. Interstrial punctures a little to much smaller than those in striae, arranged in single row except in interstrial 2 to 3 which has scattered large and small punctures. Second stria about 1/4 length of elytron with 9 to 13 punctures. Mesosternal keel weakly raised. Metacoxal process triangular with apex towards rear, a small approximately oval area in midline devoid of sculpture. Ventral surface, rugose-punctate with smallish punctures. First abdominal segment with weak midline keel in front 1/4. Rugose portion of metafemur 3/4 length of femur, that of mesofemur 2/3–3/4 that of profemur about 1/2 on front edge and a little greater on hind edge.

Male: Protarsi four-segmented. First three segments subequal in length, first moderately expanded, second rather less so and third not at all. Apical abdominal segment very weakly notched with weak protruberence at each side of notch.

Remarks
A small widespread northern species closely resembling *B. ralphi* and *B. veronicae*, separated by range of characters given in Table 2. Generally with

larger elytral punctures and more strongly impressed striae although these are weakly impressed on the disc in some specimens.

Distribution (Fig. 75)
Northern Australia, predominantly the western half.

Types
Holotype, male, 'Tindal, N.T. 14°31'S, 132°22'E, 1-20 Dec. 1967, light trap. W. J. M. Vestjens', in ANIC. Paratypes, four same data as holotype, in ANIC.

Berosus ralphi sp. nov.
(Figs 72, 73)

Description (number examined 18)
Length 3.5–4.5 mm. Oval. Not humpbacked. Apex of elytron truncate or very weakly produced into two broad short spines. Yellow-brown, punctures on elytron and a few small spots in apical 1/2 of elytron darker. Ventral abdominal segments other than apical are blotched darker. Shiny. Elytron often moderately reticulate. Punctures of head moderately impressed, sparse, smaller towards front and center. Punctures of pronotum moderately impressed, sparse, variable in size, with row of small punctures along extreme front and rear margins. Elytron striae moderately to weakly impressed. Punctures on striae close, well impressed, about size of larger pronotal punctures. Interstrial punctures much smaller than those in striae and scattered in interstriae one to five, strong tendency to be arranged in a single row in interstriae lateral to stria 6. Interstria 3 with punctures of two sizes. Stria 2 short, often poorly marked with 7 to 13 punctures. Mesosternal keel moderately raised. Metacoxal process, sharply triangularly produced backwards and downwards, a small slightly raised area in midline in centre. Ventral surface rugose-punctate. First abdominal segment with raised midline keel in front 1/4. Rugose portion of metafemur 3/4 length of femur, that on mesofemur 1/2–2/3, that on profemur 1/4–1/2 length of femur.

Male: Apical abdominal segment sinuate on hind margin. First two segments of protarsi expanded, third segment not expanded. First three segments progressively smaller in length.

Remarks
Similar in general facies to *B. vijae* and *B. veronicae* but differing from them in the greater number and smaller size of the punctures in the first elytral interstriae, where they are arranged in more than one line, and in characters of the aedeagus. In all specimens so far examined the tip of the metacoxal process is sharply deflexed downwards, a character not seen in other Australian *Berosus*.

Distribution (Fig. 77)
Coastal north-western Australia and 'Queensland.

Types
Holotype, male, 'Wyndham W.A. S. Stephens 20.2.01', in SAM. Paratyes 17; seven same data as holotype, in S.A.M, one 'Derby N.W.A. W. D. Dodd', in SAM; seven 'Derby N.W.A.', in SAM; two 'Queensland J.8261', in SAM.

Berosus subovatus Knisch
(Figs 36, 42)

Berosus sticticus Fairmaire, 1879, p. 82.
Berosus subovatus Knisch, 1924 (not Boheman, 1859)

Type
Holotype, female, Peak Downs N.T., in MNHN, seen.

Description (number examined four)
Length 4.6–5.0 mm. Elongate oval. Elytra not humpbacked. Shiny. Apex of elytron rounded or weakly truncated. Dorsal surface light-brown, punctures and striae on disc of elytron and vague patches on head, pronotum and elytron darker. Punctures in lateral striae on elytron with large squarish darkish subsurface markings. Ventral surface dark-brown to black, appendages lighter, rugose portions of femura with a slightly darker hue than rest of leg. Head with scattered relatively small punctures, those at back of head a little larger than size of eye facet, those towards centre and front of head smaller. Pronotum sparsely and unevenly covered with punctures, of two sizes, larger about same size as those at rear of head. Elytral striae weakly impressed, over most of elytron little more than series of punctures. Second elytral stria with 6 to 7 punctures, about same size or a little smaller than the larger ones on pronotum 2 × size of those in adjacent interstrial areas. Punctures in interstriae 3 and 5 of two sizes. Interstrial punctures lateral to stria 6 arranged in one line. Those towards sides and apex small and weakly impressed. Ventral surface finely rugose punctate. Midline of mesosternum moderately and evenly raised, moderately projected backwards. Midline of first abdominal segment weakly carinate in front 1/4. Metacoxal process raised, triangularly produced backwards, midline carinate in rear 1/4 a large roughly diamond-shaped area in middle, devoid of sculpture. Rugose portion of metafemur 2/3 length of femur, that of metafemur 2/3, that of profemur about 1/2 length of femur.

Male: Protarsi four-segmented, basal two segments moderately expanded. Basal segment larger than second which is larger than third.

Remarks

The relatively small number of punctures in the second elytral stria, strong tendency for punctures in interstriae to be arranged in one line, and sparse and variably-sized pronotal and head punctures separate this species from related species. *B. vijae* and *B. ralphi* are difficult to definitely separate from this species apart from the form of the aedeagus which is considerably shorter than the parameres in *B. subovatus*.

Distribution (Fig. 81)

Known from only two localities: Station Creek in north Qld. (in ANIC), and Katherine, N.T. (in ANIC). (The type is labelled 'Austral'.)

Berosus nicholasi sp. nov.

(Figs 66, 69)

Description (number examined 51)

Length 5.0–6.5 mm. Elongate oval. Elytra not humpbacked. Apex of elytron weakly extended with two small spines, inner one often small or lacking. Shiny, often moderately reticulate with a very fine even reticulation. Dorsal surface light-brown with punctures, elytral striae and patches on head, pronotum and elytron dark-brown. Ventral surface dark-brown to black with lighter mottlings. Appendages brown, tip of labial palpi darker. Head relatively narrow, evenly and quite densely covered with strong punctures, punctures weaker towards front. Pronotum moderately but unevenly covered with strongly impressed punctures of two general sizes with the larger ones predominating, rows of small punctures along front and rear margins. Elytral striae quite strongly impressed except towards sides and back. Strial punctures relatively small, a little smaller than the larger ones on the pronotum. Interstrial punctures small, relatively sparse, those lateral to stria 8 arranged in one line, smaller than strial punctures over most of elytron. Some of the more central interstriae with a few large punctures with short setae. Ventral surface densely rugose-punctate. Midline of mesosternum raised, moderately projecting backwards. Midline of first abdominal segment carinate only in extreme front. Metacoxal process raised, triangularly produced backwards, small elongate oval area in centre devoid of sculpture. Rugose portion of metafemur 2/3–1/4 length of metafemur, that of mesofemur 1/2–2/3, that of profemur 1/3–1/2 length of femur.

Male: Protarsi four-segmented. Basal segments subequal, quite strongly dilated. Apical abdominal segment not notched.

Remarks

One of a group of very similar northern species which can only be confidently separated by characters of the aedeagus. In all but a few cases, larger than other species in the group other than *B. debilipennis*, which usually has much stronger punctures on the elytron. See Table 2.

Distribution (Fig. 79)

Coastal northern Australia from Derby, W.A. to Townsville, Qld.

Types

Holotype, male '12°28'S 131°03'E Howard Springs, N.T. 24 km S of Darwin 10.xi.72, rainforest, at light, E. Britton', in ANIC. Paratypes, 12 same data as holotype; 11 in ANIC, one in CW.

Berosus debilipennis Blackburn

(Figs 44, 45, 49, 51)

Berosus debilipennis Blackburn, 1898, p. 223.

Type

Holotype, female, Cape York, Qld, in BM(NH), seen.

Description (number examined 74)

Length 4.0–6.0mm. Elongate oval. Elytra not humpbacked. Apex of elytron rounded or with two weak spines. Dorsal surface light-brown with punctures on pronotum and elytron, elytral striae and patches on pronotum and elytron darker. Rear of head dark-brown, centre and front lighter. Ventral surface dark-brown, appendages lighter, tip of labial palpi dark-brown. Head with sparse to moderately dense, strong punctures, a little larger than eye facets, grading to obsolete towards front. Pronotum rather unevenly but moderately covered with strong punctures the size of those at rear of head, a few smaller punctures towards midline and front. Elytral striae quite strongly impressed particularly laterally and towards rear. Second elytral striae with 10 to 18 punctures, 2 x the size of those in adjacent interstrial areas. Interstrial punctures scattered not arranged in a single row except in some places towards sides and rear. A few large punctures in interstriae 3 and 5. Ventral surface densely rugose-punctate. Midline of mesosternum weakly raised, moderately projected backwards. Midline of first abdominal segment weakly carinate at extreme front. Metacoxal process raised, narrowly triangularly produced backwards, with a narrow diamond-shaped area in middle unsculptured. Rugose portion of metafemur 2/3–3/4 length of femur, that of mesofemur 1/2–2/3, that of profemur 1/3–1/2 length of femur.

Male: Protarsi four-segmented. First and second segments moderately expanded, first much longer than second, which is about the same length as third. Apical abdominal segment broadly but very weakly notched.

Remarks

A widespread northern species which I initially considered to be composed of at least two species. Further study may show that it includes several closely related species. In particular, individuals can be placed in one of two groups according to the shape of the aedeagus. One group has the parameres thin and the aedeagus roundly hooded at the tip, the other has thick parameres and has a transverse ridge on the upper surface behind the roughened end portion of the aedeagus. These characters are to some extent variable and intermediates exist, e.g. notably a specimen from Cunnamulla, Qld., in SAM. This species can be separated from the rather similar *B. nicholasi* by the usually much stronger elytral punctures and the relatively smaller second segment of the male protarsi (Table 2).

Distribution (Fig. 80)

Coastal northern Australia from Derby to Cairns region.

CHECKLIST OF AUSTRALIAN *BEROSUS*
(in alphabetical order)

- *B. australiae* Mulsant
  - = *externespinosus* Fairmaire
  - = *gravis* Blackburn
- *B. amoenus* sp. nov.
- *B. arcus* sp. nov.
- *B. approximans* Fairmaire
  - = *B. auriceps* Blackburn
  - = *B. blackburni* Zaitz
  - = *B. ovipennis* Fairmaire
  - = *B. simulans* Blackburn
  - = *B. stigmaticollis* Fairmaire
- *B. aquilo* sp. nov.
- *B. dallasae* sp. nov.
- *B. debilipennis* Blackburn
- *B. decipiens* Blackburn
- *B. discolor* Blackburn
  - = *B. flindersi* Blackburn
- *B. duplopunctatus* Blackburn
- *B. gibbae* sp. nov.
- *B. involutus* (W. MacLeay)
- *B. josephenae* sp. nov.
- *B. juxtadiscolor* sp. nov.
- *B. macropunctatus* sp. nov.
- *B. macumbensis* Blackburn
- *B. majusculus* Blackburn
- *B. munitipennis* Blackburn
- *B. nicholasi* sp. nov.
- *B. niger* sp. nov.
- *B. nutans* (W. MacLeay)
  - = *B. pallidulus* Fairmaire
- *B. pulchellus* W. MacLeay
  - = *B. devisi* Blackburn
- *B. queenslandicus* Blackburn
  - = *B. quartinus* d'Orchymont
- *B. quadrapunctatus* sp. nov.
- *B. ralphi* sp. nov.
- *B. reardoni* sp. nov.
- *B. sadieae* sp. nov.
- *B. subovatus* Knisch
  - = *B. sticticus* Fairmaire
- *B. trishae* sp. nov.
- *B. timmsi* sp. nov.
- *B. veronicae* sp. nov.
- *B. vijae* sp. nov.

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